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REPORT
OF THE
DIRECTOR OF THE MINT
UPON THE
PRODUCTION
OF THE
PRECIOUS METALS IN THE UNITED STATES
DURING THE
CALENDAR YEAR 1899.



WASHINGTON:
GOVERNMENT PRINTING OFFICE.
1900.

TREASURY DEPARTMENT,
Document No. 2209.
Director of the Mint.

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LETTER OF TRANSMITTAL.

TREASURY DEPARTMENT,
BUREAU OF THE MINT,
Washington, D. C., November 26, 1900.

SIR: I have the honor to hand you herewith my report on the production of gold and silver in the United States and in the world for the calendar year 1899, together with such information as to their coinage and consumption as this Bureau has been able to gather. The returns for this country have been carefully obtained through officials and special agents of this Bureau, and the aggregate of precious metals reported has been actually traced from production to market. The figures are therefore conservative, but are believed approximately full. The statistics for foreign countries are obtained from official sources wherever governmental calculations are made, and where such returns can not be had the best obtainable estimates are given and the authority stated.

Respectfully,

GEO. E. ROBERTS,
Director of the Mint.

The SECRETARY OF THE TREASURY.

PART I.

PRODUCTION, EMPLOYMENT, AND MOVEMENT OF GOLD AND SILVER
IN THE UNITED STATES, AND SURVEY OF THE WORLD'S
PRODUCTION OF GOLD AND SILVER IN 1899.

GENERAL REPORT.

PRODUCTION OF GOLD IN THE UNITED STATES, CALENDAR YEAR 1899.

The production of gold in the United States in the calendar year 1899 was 106,911 kilograms, fine, or 3,437,210 ounces, fine, of the value of \$71,053,400.

Australasia produced 119,352 kilograms, or 3,837,181 ounces, fine, of the value of \$79,321,581.

Africa produced 110,182 kilograms, or 3,542,361 ounces, fine, of the value of \$73,227,108, of which 98 per cent came from the Transvaal.

These three countries are the great gold producers of the world, their output aggregating, in round numbers, 336,400 kilograms, or 10,820,000 ounces, fine, of the value of \$223,600,000. This makes 73 per cent of the product of the world, i. e., precisely the same percentage as in 1898. While these countries, taken together, have retained the same position in the world's production, Australia and Africa have changed places, the former now leading the list of gold-producing countries.

This is due partly to the decrease in the product of the Transvaal as a result of the war, to a great extent, however, to the growth of Australian production, which has outrun the highest limit ever reached by the Transvaal.

Next after the main gold-producing countries follow Russia, with 33,354 kilograms, valued at \$22,167,100; British North America, with 32,086 kilograms, valued at \$21,324,300; British India, with 12,816 kilograms, valued at \$8,517,500; Mexico, with 12,790 kilograms, valued at \$8,500,000, and China, with 8,387 kilograms, valued at \$5,574,400. These five aggregate, in round figures, 99,000 kilograms, of the value of \$66,100,000, or about 22 per cent of the whole, leaving 5 per cent to the remainder of the world.

Distributing the product by political divisions, the first place is held by Great Britain with her colonial empire, which produced, in 1899, 166,680 kilograms, of the value of \$110,775,744, or over one-third of the world's product. Together with the Transvaal product, it aggregates, in round figures, 275,000 kilograms, fine, of the value of \$182,500,000, i. e., 60 per cent of the world's production. The United States comes next with 23 per cent of the world's product; that is, more than all the rest of the countries of the world.

The output of the United States in 1899 was the largest in its history, exceeding by \$6,053,400 the estimated product for 1853, the record year following the discovery of the Californian placers.

The increase over 1898 was \$6,590,400. This increase is due principally to Alaska, Colorado, and Utah. Increases also took place in South Dakota, Oregon, Idaho, and Arizona, and some of the minor producing States. On the other hand, decreases are reported from Nevada, Montana, and California.

Alaska has more than doubled her output, the increase amounting to \$2,934,700. In Colorado the increase was \$2,787,500 and in Utah \$1,165,400. The decrease in Nevada reached \$775,500, or more than one-quarter of the previous year's output. The decrease in California

was \$440,100 and in Montana \$366,800. It must be remembered, however, that during the previous year California showed an increase of \$1,019,600, and Montana of \$753,500, over 1897, so that while these States failed to maintain the scale reached by them in 1898, they still showed good progress as compared with 1897. Arizona, whose output had decreased in 1898, is slowly improving.

In estimating the gold yield of the United States in any given year only that gold is looked upon as really produced that has been refined, made ready for the market, and the ascertained amount of domestic origin (which is comparatively insignificant) that has been exported to foreign countries for reduction.

It has been the custom of the Bureau of the Mint to make for every calendar year two independent calculations of the gold product of the country and to take their mean as the closest approximation that can be had to the actual output of the mines. The first of these is based on the amount of gold put upon the market by private refineries during the year, plus the fine gold contained in the unrefined of domestic production deposited at the mints and assay offices of the United States, plus the pure metal of domestic production contained in ores, copper matte, etc., exported to other countries for reduction. The second calculation is based on the known disposition made of the newly produced gold in any calendar year. Such gold is either deposited at the mints and assay offices of the United States, or exported from the United States in form of bullion, ores, or copper matte, or used in the industrial arts. If foreign gold bullion enters into any of the above items, its amount must of course be deducted.

Put in tabular form, the first calculation of the gold product of the United States in the calendar year 1899, assumes the following shape:

APPROXIMATE GOLD PRODUCT OF THE MINES OF THE UNITED STATES DURING THE CALENDAR YEAR 1899.

Items reported for 1899.	Fine ounces.
Domestic product in fine gold bars reported by private refineries	2, 434, 248
Unrefined gold of domestic production deposited at the mints and assay offices	999, 504
Domestic gold contained in ores, copper matte, etc., exported for reduction.....	1, 055
Total	3, 434, 807

The second calculation or disposition of the gold yield of the mines of the United States in the calendar year 1899, is as follows:

APPROXIMATE DISPOSITION OF THE GOLD PRODUCT OF THE MINES OF THE UNITED STATES DURING THE CALENDAR YEAR 1899.

Disposition.	Fine ounces.
Bullion deposited at the mints and assay offices classified as of domestic production...	3, 949, 680
Domestic bullion other than United States mint or assay office bars exported from the United States.....	13, 678
Domestic gold in ores, copper matte, etc., exported.....	1, 055
Bullion of domestic production reported by private refineries in the United States as having been made into bars for manufacturers and jewelers for use in the industrial arts.....	33, 639
Total	3, 998, 052
Deduct foreign bullion reported to the Bureau of the Mint by private refiners in the United States as contained in their product of fine gold bars deposited at the mints and assay offices or entered at the custom-houses for exportation as of domestic production, but derived from foreign ores.....	558, 439
Net total	3, 439, 613

The variance between the results of these calculations—4,806 ounces—is only somewhat over one-tenth of 1 per cent, which is generally considered in statistics an exceedingly close approximation to the actual figures.

The average—3,437,210 ounces, or 106,911 kilograms, fine, of the value of \$71,053,400—may be taken as representing the actual output of the mines of the country.

The gold production for 1898 and 1899, with the increases and decreases in the various States and Territories, was as follows:

TABLE SHOWING THE PRODUCT OF GOLD IN THE SEVERAL STATES AND TERRITORIES IN 1898 AND 1899 AND THE INCREASE OR DECREASE OF THE PRODUCTION OF EACH IN THE LATTER YEAR.

State or Territory.	Value.			
	1898.	1899.	Increase.	Decrease.
Alaska	\$2,524,800	\$5,459,500	\$2,934,700	.....
Arizona	2,465,100	2,566,100	101,000	.....
California	15,637,900	15,197,800	.....	\$440,100
Colorado	23,195,300	25,982,800	2,787,500	.....
Georgia	128,600	113,000	.....	15,600
Idaho	1,716,900	1,889,000	172,100	.....
Michigan	100	100	.....	.....
Montana	5,126,900	4,760,100	.....	366,800
Nevada	2,994,500	2,219,000	.....	775,500
New Mexico	539,000	584,100	45,100	.....
North Carolina	84,000	34,500	.....	49,500
Oregon	1,177,600	1,429,500	251,900	.....
South Carolina	104,200	160,100	55,900	.....
South Dakota	5,699,700	6,469,500	769,800	.....
Texas	300	6,900	6,600	.....
Utah	2,285,400	3,450,800	1,165,400	.....
Washington	766,200	685,400	.....	80,800
Alabama	16,500	45,200	28,700	.....
Iowa				
Maryland				
Minnesota				
Tennessee				
Vermont				
Virginia				
Wyoming				
Maine	64,463,000	71,053,400	8,318,700	1,728,300
Missouri				
Total	64,463,000	71,053,400	8,318,700	1,728,300
Net increase .....	.....	.....	6,590,400	.....

PRODUCTION OF SILVER IN THE UNITED STATES, CALENDAR YEAR 1899.

The United States still occupies the second place as a silver producer, to which it was relegated by Mexico in 1897. In 1899 it produced 1,703,720 kilograms, fine, with a commercial value of \$32,858,700, as against the Mexican production of 1,730,089 kilograms, fine, with a commercial value of \$33,367,300. Together they produce two-thirds of the world's product, about one-third each. No other country approaches them; the nearest being Australasia and Bolivia, with 395,000 and 337,000 kilograms (in round numbers), respectively; next after them follows Germany, with 194,000 kilograms; all the three together producing 18 per cent of the world's output, leaving about one-sixth of the whole product to all other countries of the world.

Geographically, the world's output of silver in 1899 is distributed as follows:

Production.	Kilograms.	Commercial value.	Per cent.
North Central and South America	4,323,000	\$83,400,000	83
Europe	432,000	8,300,000	8
Australasia.....	395,000	7,600,000	8
Asia (Japan)	52,000	1,000,000	1
Total	5,202,000	100,300,000	100

This table shows that silver is to-day substantially an American product, five-sixths of all silver produced in 1899 having come from North, Central, and South America. Europe and Australia produced 8 per cent each. Africa produced no silver. The total silver product of Asia is unknown. All silver produced in China stays at home and does not figure in the world's market.

The silver product of the United States in any given calendar year is estimated in precisely the same manner as the gold product, namely, by making two independent calculations of the same and taking their mean as the actual product.

APPROXIMATE SILVER PRODUCT OF THE MINES OF THE UNITED STATES DURING THE CALENDAR YEAR 1899.

Items reported for 1899.	Fine ounces.
Domestic product in fine silver bars reported by private refineries	54,995,454
Unrefined silver of domestic production deposited at the mints and assay offices	372,741
Domestic silver contained in ores, copper matte, etc., exported for reduction.....	127,250
Total	55,495,445

The second calculation or disposition of the silver yield of the mines of the United States in the calendar year 1899 is as follows:

APPROXIMATE DISPOSITION OF THE SILVER PRODUCT OF THE MINES OF THE UNITED STATES DURING THE CALENDAR YEAR 1899.

Disposition.	Fine ounces.
Bullion deposited at the mints and assay offices classified as of domestic production...	5,338,344
Domestic bullion other than United States mint or assay office bars, exported from the United States (custom-house), rating at commercial value \$49,785,082, corresponding, at average price of silver during the year, to \$0.60 per fine ounce.....	82,975,137
Domestic silver in ores, copper matte, etc., exported.....	127,250
Bullion of domestic production reported by private refineries in the United States as having been made into bars for manufacturers and jewelers, for use in the industrial arts.....	4,852,989
Total	93,293,720
Deduct decrease in the approximate stock of silver bars, exclusive of any bars bearing the stamp of a United States mint or assay office in the United States, held by the Mercantile Safe Deposit Company and other institutions at the close of the calendar year 1899, according to information furnished the Bureau of the Mint.....fine ounces..	181,851
Deduct foreign bullion reported to the Bureau of the Mint by private refineries in the United States as contained in their product of fine silver bars deposited at the mints and assay offices, or entered at the custom-houses for exportation as of domestic production but derived from foreign ores.....fine ounces..	39,078,425
	39,260,276
Net total.....	54,033,444

The average of these results, 54,764,500 ounces, or 1,703,720 kilograms, fine, of a coining value of \$70,806,626 and a commercial value, at the average price of an ounce of silver during the year, \$0.60, of \$32,858,700, is the estimated yield.

The difference between the two estimates, amounting in round numbers to 1,400,000 ounces, or nearly 3 per cent of the total output, appears very large when contrasted with the degree of approximation reached by this Bureau in estimating the yield of gold. This difference, however, is sufficiently explained when it is observed that the second item in the second calculation is obtained from the invoiced value of silver bullion, other than United States mint or assay office bars, exported from the United States, by dividing this value by the average quoted London price of an ounce of fine silver during the year. Whereas the exports of domestic bullion constitute but an insignificant fraction of the total yield of gold, in the disposition of the silver product it is the predominant item.

On the other hand, the average monthly prices of an ounce of fine silver widely deviate from the yearly average, the highest price being nearly 3 per cent above and the lowest more than 2 per cent below the average. It is readily seen that the average quotation for the year, which takes no cognizance of the quantities sold at each quoted price, may only exceptionally coincide with the average price at which all sales were made; so if the average price of fine silver actually sold had been \$0.58961 instead of \$0.60, as assumed, both estimates would exactly agree.

A further cause of divergence arises from the fact that the invoice price is necessarily assumed in the table to represent the quoted London price.

In reality the price of the sale, although the London price, is not necessarily the price at the date of the invoice. There are some silver producers who universally sell and for several years have sold all of their silver for delivery in sixty days. Their shipments of to-day are made, therefore, against sales which they made nearly sixty days ago. Furthermore, while in most cases the London quotation is the exact amount London will pay for silver to be shipped within ten days, sometimes, however, the quotation is nominal and London purchasers pay slightly above or slightly below it. Then again the market sometimes changes during the day and will either advance after the quotation is made, or decline after the quotation is made. Sales may and probably do vary in a very large number of cases from the quotation of the day the sale is made.

Thus it is seen, in the absence of minuter information, coming directly from the shipper, the result can only be a more or less correct approximation.

The production of silver in the United States for 1899 shows a slight increase over the estimated yield for 1898. This result is due to considerable increases in Montana and Utah, which are offset, however, by large decreases in Idaho and Arizona.

The following table gives details of the silver production of the United States:

TABLE SHOWING THE PRODUCT OF SILVER IN THE SEVERAL STATES AND TERRITORIES IN 1898 AND 1899 AND THE INCREASE OR DECREASE OF THE PRODUCTION OF EACH IN THE LATTER YEAR.

State or Territory.	Weight.			
	1898.	1899.	Increase.	Decrease.
	<i>Fine ounces.</i>	<i>Fine ounces.</i>	<i>Fine ounces.</i>	<i>Fine ounces.</i>
Alabama.....	100	100		
Alaska.....	92,400	140,100	47,700	
Arizona.....	2,246,800	1,578,300		668,500
California.....	642,300	824,300	182,000	
Colorado.....	22,815,600	22,662,900		152,700
Georgia.....	500	400		100
Idaho.....	5,073,800	3,851,800		1,222,000
Michigan.....	32,400	112,800	80,400	
Montana.....	14,807,200	16,096,000	1,288,800	
Nevada.....	805,000	843,400	38,400	
New Mexico.....	425,300	503,300	78,000	
North Carolina.....	700	300		400
Oregon.....	130,000	134,300	4,300	
South Carolina.....	300	400	100	
South Dakota.....	152,300	145,600		6,700
Texas.....	472,900	520,000	47,100	
Utah.....	6,485,900	7,093,300	607,400	
Washington.....	254,400	256,000	1,600	
Wyoming.....	100	400	300	
Maryland.....		100	100	
Virginia.....		100	100	
Maine.....		500	500	
Missouri.....		100	100	
Total.....	54,438,000	54,764,500	2,376,900	2,050,400
Net increase.....			326,500	

The following table shows the product, by States, as reported by Mint officers and agents:

PRODUCT OF GOLD AND SILVER IN THE INDIVIDUAL STATES AND TERRITORIES REPORTED BY MINT OFFICERS AND AGENTS FOR THE CALENDAR YEAR 1899.

State or Territory.	Gold.		Silver.		Total value.
	Fine ounces.	Value.	Fine ounces.	Coining value.	
Alabama.....	230	\$4,766	50	\$65	\$4,831
Alaska.....	270,997	5,602,012	177,383	229,344	5,831,356
Arizona.....	125,678	2,598,000	1,864,726	2,410,959	5,008,959
California.....	741,880	15,336,031	855,869	1,106,578	16,442,609
Colorado.....	1,270,593	26,265,487	22,955,398	29,679,706	55,945,193
Georgia.....	5,665	117,106	446	576	117,682
Idaho.....	102,106	2,110,718	4,086,413	5,283,443	7,394,161
Maryland.....	57	1,173	2	3	1,176
Michigan.....	4	83	112,823	145,872	145,955
Montana.....	233,127	4,819,157	16,850,755	21,786,835	26,605,992
Nevada.....	120,885	2,498,910	960,517	1,241,880	3,740,790
New Mexico.....	41,370	855,200	526,585	680,837	1,536,037
North Carolina.....	1,969	40,713	5,529	7,149	47,862
Oregon.....	70,984	1,467,379	145,353	187,932	1,655,311
South Carolina.....	7,755	160,312	402	520	160,832
South Dakota.....	313,037	6,471,049	185,992	240,474	6,711,523
Tennessee.....	8	176	1	1	177
Texas.....	333	6,884	519,972	672,287	679,171
Utah.....	169,631	3,506,582	7,183,107	9,287,250	12,793,832
Virginia.....	374	7,729	189	245	7,974
Washington.....	35,284	729,388	289,661	374,511	1,103,899
Wyoming.....	1,277	26,400			26,400
Total.....	3,513,244	72,625,255	56,721,173	73,336,467	145,961,722

The product of the precious metals reported by mint officers and agents in the above table is greater than the actual or finished product, and the reason for this is, that it is the estimated value of the ore, as

produced from the mines, while the following table, the estimate of this Bureau, gives the value of the finished product, fine metal ready for the market:

APPROXIMATE DISTRIBUTION BY PRODUCING STATES AND TERRITORIES OF THE PRODUCT OF GOLD AND SILVER IN THE UNITED STATES FOR THE CALENDAR YEAR 1899, AS ESTIMATED BY THE DIRECTOR OF THE MINT.

State or Territory.	Gold.		Silver.		Total value.
	Fine ounces.	Value.	Fine ounces.	Coining value.	
Alabama	208	\$4,300	100	\$129	\$4,429
Alaska	264,104	5,459,500	140,100	181,140	5,640,640
Arizona	124,133	2,566,100	1,578,300	2,040,630	4,606,730
California	735,194	15,197,800	824,300	1,065,762	16,263,562
Colorado	1,256,920	25,982,800	22,662,900	29,301,527	55,284,327
Georgia	5,466	113,000	400	517	113,517
Idaho	91,380	1,889,000	3,851,800	4,980,105	6,869,105
Maine	174	3,600	500	646	4,246
Maryland	39	800	100	129	929
Michigan	5	100	112,800	145,843	145,943
Missouri	5	100	100	129	229
Montana	230,270	4,760,100	16,096,000	20,810,990	25,571,090
Nevada	107,344	2,219,000	843,400	1,090,457	3,309,457
New Mexico	28,256	584,100	503,300	650,731	1,234,831
North Carolina	1,669	34,500	300	388	34,888
Oregon	69,152	1,429,500	134,300	173,641	1,603,141
South Carolina	7,745	160,100	400	517	160,617
South Dakota	312,962	6,469,500	145,600	188,251	6,657,751
Texas	334	6,900	520,000	672,323	679,223
Utah	166,933	3,450,800	7,093,300	9,171,135	12,621,935
Vermont	5	100	.....	.....	100
Virginia	343	7,100	100	129	7,229
Washington	33,156	685,400	256,000	330,990	1,016,390
Wyoming	1,413	29,200	400	517	29,717
Total	3,437,210	71,053,400	54,764,500	70,806,626	141,860,026

The sources of the production of gold and silver in the United States, compiled from the reports made by Mint officers and agents, is given in the following table:

DISTRIBUTION OF THE GOLD AND SILVER PRODUCT OF THE UNITED STATES FOR THE CALENDAR YEAR 1899 AS TO SOURCES OF PRODUCTION, AS REPORTED BY MINT OFFICERS AND AGENTS.

State or Territory.	Gold.		Silver.		
	Quartz.	Placer.	Quartz.	Lead ores.	Copper ores.
	<i>Fine ounces.</i>	<i>Fine ounces.</i>	<i>Fine ounces.</i>	<i>Fine ounces.</i>	<i>Fine ounces.</i>
Alabama	47	183	50	.....	.....
Alaska	119,720	151,277	177,383	.....	.....
Arizona	117,011	8,667	1,118,251	115,074	631,401
California	570,198	171,682	389,162	109,732	356,975
Colorado	1,238,828	31,765	5,279,741	a 17,675,657	.....
Georgia	3,390	2,275	446	.....	.....
Idaho	70,842	31,264	1,022,192	3,064,221	.....
Maryland	57	.....	2	.....	.....
Michigan	4	.....	.....	.....	112,823
Montana	204,300	28,827	4,455,488	2,504,695	9,890,572
Nevada	119,975	910	730,629	179,070	50,818
New Mexico	38,470	2,900	201,585	125,000	200,000
North Carolina	689	1,280	5,529	.....	.....
Oregon	57,097	13,887	93,353	50,000	2,000
South Carolina	7,558	197	402	.....	.....
South Dakota	213,037	.....	185,992	.....	.....
Tennessee .....	.....	8	1	.....	.....
Texas	333	.....	519,972	.....	.....
Utah	169,631	.....	1,542,702	5,028,660	611,745
Virginia	205	169	189	.....	.....
Washington	30,894	4,390	138,161	148,500	3,000
Wyoming .....	.....	1,277	.....	.....	.....
Total	3,062,286	450,958	15,861,230	29,000,609	11,859,334

a Lead and copper ores.

Considered as to character of source, the product of 1899 shows some change with regard to silver, as exhibited in the following table:

Source.	1891.	1897.	1898.	1899.
	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>
Quartz mills	49.2	21.8	24.7	28.0
Lead bullion	40.6	57.5	56.2	51.1
Copper bullion	10.2	20.7	19.1	20.9
Total	100	100	100	100

The product from lead ores continues to hold the first place, although its percentage has somewhat decreased, while the percentage of the mill product has correspondingly increased, showing, perhaps, a tendency to revert to former conditions. . The percentage of the product from copper ores, which had doubled between 1891 and 1897, has remained practically stationary.

The annual production of gold and silver from the mines of the United States since 1860 is shown in the following table:

(The commercial value of the silver product is reckoned at the average yearly market price of silver and its coining value in United States dollars.)

PRODUCT OF GOLD AND SILVER FROM MINES IN THE UNITED STATES SINCE 1860.

[The estimate for 1860-72 is by R. W. Raymond, commissioner, and since 1872 by the Bureau of the Mint.]

Calendar year.	Gold.		Silver.		
	Fine ounces.	Value.	Fine ounces.	Commercial value.	Coining value.
1860	2, 225, 250	\$46, 000, 000	116, 015	\$157, 000	\$150, 000
1861	2, 080, 125	43, 000, 000	1, 546, 875	2, 062, 000	2, 000, 000
1862	1, 896, 300	39, 200, 000	3, 480, 469	4, 685, 000	4, 500, 000
1863	1, 935, 000	40, 000, 000	6, 574, 219	8, 842, 000	8, 500, 000
1864	2, 230, 088	46, 100, 000	8, 507, 812	11, 443, 000	11, 000, 000
1865	2, 574, 759	53, 225, 000	8, 701, 171	11, 642, 000	11, 250, 000
1866	2, 588, 063	53, 500, 000	7, 734, 375	10, 356, 000	10, 000, 000
1867	2, 502, 197	51, 725, 000	10, 441, 406	13, 866, 000	13, 500, 000
1868	2, 322, 000	48, 000, 000	9, 281, 250	12, 307, 000	12, 000, 000
1869	2, 394, 563	49, 500, 000	9, 251, 250	12, 298, 000	12, 000, 000
1870	2, 418, 750	50, 000, 000	12, 375, 000	16, 734, 000	16, 000, 000
1871	2, 104, 313	43, 500, 000	17, 789, 062	23, 578, 000	23, 000, 000
1872	1, 741, 500	36, 000, 000	22, 236, 328	29, 396, 000	28, 750, 000
Total	29, 012, 908	599, 750, 000	118, 065, 232	157, 366, 000	152, 650, 000
1873	1, 741, 500	36, 000, 000	27, 650, 000	35, 890, 000	35, 750, 000
1874	1, 620, 563	33, 500, 000	28, 849, 000	36, 869, 000	37, 300, 000
1875	1, 615, 725	33, 400, 000	24, 518, 000	30, 549, 000	31, 700, 000
1876	1, 930, 162	39, 900, 000	30, 909, 000	34, 690, 000	38, 800, 000
1877	2, 268, 788	46, 900, 000	30, 783, 000	36, 970, 000	39, 800, 000
1878	2, 476, 800	51, 200, 000	34, 960, 000	40, 270, 000	45, 200, 000
1879	1, 881, 787	38, 900, 000	31, 550, 000	35, 430, 000	40, 800, 000
1880	1, 741, 500	36, 000, 000	30, 320, 000	34, 720, 000	39, 200, 000
1881	1, 678, 612	34, 700, 000	33, 260, 000	37, 850, 000	43, 000, 000
1882	1, 572, 187	32, 500, 000	36, 200, 000	41, 120, 000	46, 800, 000
1883	1, 451, 250	30, 000, 000	35, 730, 000	39, 660, 000	46, 200, 000
1884	1, 489, 950	30, 800, 000	37, 800, 000	42, 070, 000	48, 800, 000
1885	1, 538, 325	31, 800, 000	39, 910, 000	42, 500, 000	51, 600, 000
1886	1, 693, 125	35, 000, 000	39, 440, 000	39, 230, 000	51, 000, 000
1887	1, 596, 375	33, 000, 000	41, 260, 000	40, 410, 000	53, 350, 000
1888	1, 604, 841	33, 175, 000	45, 780, 000	43, 020, 000	59, 195, 000
1889	1, 587, 000	32, 800, 000	50, 000, 000	46, 750, 000	64, 646, 000
1890	1, 588, 880	32, 845, 000	54, 500, 000	57, 225, 000	70, 465, 000
1891	1, 604, 841	33, 175, 000	58, 330, 000	57, 630, 000	75, 417, 000
1892	1, 596, 375	33, 000, 000	63, 500, 000	55, 563, 000	82, 101, 000
1893	1, 739, 323	35, 955, 000	60, 000, 000	46, 800, 000	77, 576, 000
1894	1, 910, 813	39, 500, 000	49, 500, 000	31, 422, 000	64, 000, 000
1895	2, 254, 760	46, 610, 000	55, 727, 000	36, 445, 000	72, 051, 000
1896	2, 568, 132	53, 088, 000	58, 835, 000	39, 055, 000	76, 069, 000
1897	2, 774, 935	57, 363, 000	53, 860, 000	32, 316, 000	69, 637, 000
1898	3, 118, 398	64, 463, 000	54, 438, 000	32, 118, 000	70, 384, 000
1899	3, 437, 210	71, 053, 000	54, 764, 000	32, 859, 000	70, 806, 000
Total	52, 082, 157	1, 076, 627, 000	1, 161, 473, 000	1, 080, 031, 000	1, 501, 647, 000
Grand total	81, 095, 065	1, 676, 377, 000	1, 279, 538, 232	1, 237, 397, 000	1, 654, 297, 000

Tables showing the product of gold and silver from mines of the United States since 1792 will be found in the Appendix.

DEPOSITS OF GOLD.

The deposits of gold at the mints and assay offices during the calendar year 1899 contained 6,279,016 fine ounces, of the value of \$129,-798,782, a decrease of \$68,558,040 in the value of deposits reported for 1898. The redeposits contained 3,897,281 fine ounces, of the value of \$80,563,941.

The deposits of domestic bullion contained 3,949,679 fine ounces, of the value of \$81,647,122.

For convenience of the Bureau the domestic bullion has been classified as unrefined, refinery bars, and refined bullion; unrefined being bullion received direct from the miners in its crude state, refinery bars (less than 0.992 in fineness) and refined bars (0.992 and over in fineness) being the product of certain smelters, refineries, cyanide, and chlorination works deposited at the mints and assay offices.

The deposits and transfers of mutilated and uncurrent domestic gold coin amounted to 66,229 fine ounces, of the value of \$1,369,079, of which amount \$1,033,025 were received from the Treasury and \$336,-054 were deposited at the mints by private individuals.

The deposits of foreign gold bullion contained 1,185,599 fine ounces, of the value of \$24,508,514, of which \$18,163,768 represents the value of deposits of unrefined and \$6,344,746 value of refined bullion, reported to have been received from the countries named in the following statement:

DEPOSITS OF FOREIGN GOLD BULLION.

Country of production.	Fine ounces.	Value.
UNREFINED.		
British Columbia	60,345	\$1,247,442
Northwest Territory	648,353	13,402,646
Ontario and Quebec	29,709	614,140
Nova Scotia	29,868	617,426
Manitoba	190	3,928
Canada, unknown	8	167
Mexico	73,914	1,527,939
Cuba	41	848
Haiti	44	910
Santo Domingo	10	207
Central America	21,967	454,098
South America	14,179	293,106
New Zealand	11	228
South Africa	20	414
Philippine Islands	13	269
Total	878,672	18,163,768
REFINED.		
England	289,044	5,975,072
New Zealand	17,878	369,571
Mexico	5	103
Total	306,927	6,344,746

The deposits of foreign gold coin received and melted by the mints and assay offices contained 925,497 fine ounces, of the value of \$19,131,710, as shown by the following table:

Country of coinage.	Fine ounces.	Value.
Great Britain	589,378	\$12,183,518
Spain	119,252	2,465,170
France	124,580	2,575,293
Mexico.....	26,482	547,403
Japan	36,315	750,704
Germany.....	571	11,815
Russia	1,600	33,070
South America.....	4,849	100,246
Other countries.....	2,476	51,181
Unknown.....	19,994	413,310
Total.....	925,497	19,131,710

The deposits of old jewelry contained 152,012 fine ounces, of the value of \$3,142,357.

REDEPOSITS OF GOLD.

The redeposits of gold bullion at the mints and assay offices contained 3,897,281 fine ounces, of the value of \$80,563,941, of which 1,086,867 fine ounces were in fine bars, 1,507,457 fine ounces in mint bars, and 1,302,957 fine ounces in unparted bars, as shown by the following table:

UNPARTED GOLD BARS.

Institution at which manufactured.	Institutions at which redeposited.						Total.
	Philadel- phia.	San Fran- cisco.	New Orleans.	New York.	Denver.	Boise.	
	<i>Fine ozs.</i>	<i>Fine ozs.</i>	<i>Fine ozs.</i>	<i>Fine ozs.</i>	<i>Fine ozs.</i>	<i>Fine ozs.</i>	<i>Fine ozs.</i>
Carson		8,391					8,391
Denver	469,113				82		469,195
Boise	72,900			15		12,819	85,734
Helena	88,981			50			89,031
Charlotte.....	13,389						13,389
St. Louis	5,985		5				5,990
Deadwood.....	17,923						17,923
Seattle	21,392	591,911					613,303
Total	689,683	600,302	5	65	82	12,819	1,302,956

FINE GOLD AND MINT GOLD BARS.

Institution at which manufactured.	Institutions at which deposited.	
	Fine gold bars, Phila- delphia.	Fine mint bars, New York.
	<i>Fine ounces.</i>	<i>Fine ounces.</i>
New York	692,516	1,507,457
Denver	394,321	
Total	1,086,867	1,507,457

The following tables show the deposits and redeposits of gold during the calendar year:

TABLE SHOWING THE WEIGHT OF THE DEPOSITS AND REDEPOSITS OF GOLD BULLION AT MINTS AND ASSAY OFFICES OF THE UNITED STATES DURING THE CALENDAR YEARS 1898 AND 1899, WITH THE INCREASE OR DECREASE OF THE SAME DURING THE LATTER YEAR.

Classification of deposits of gold bullion.	Calendar year.		Increase, 1899.	Decrease.
	1898.	1899.		
	<i>Fine ounces.</i>	<i>Fine ounces.</i>	<i>Fine ounces.</i>	<i>Fine ounces.</i>
Domestic bullion, unrefined	876, 733	999, 503	122, 770	.....
Domestic bullion refinery, bars.....	800, 963	788, 827	.....	12, 136
Domestic bullion, refined	1, 925, 480	2, 161, 349	235, 869	.....
Total domestic bullion.....	3, 603, 176	3, 949, 679	358, 639	12, 136
Domestic coin, Treasury transfers	26, 564	16, 257	.....	10, 307
Domestic coin purchased	37, 230	49, 972	12, 742	.....
Foreign bullion, unrefined.....	517, 521	878, 672	361, 151	.....
Foreign bullion, refined.....	1, 765, 858	306, 927	.....	1, 458, 931
Foreign coins melted	2, 760, 619	925, 497	.....	1, 835, 122
Jewelers' bars, etc.....	141, 493	152, 012	10, 519	.....
Total deposits.....	8, 852, 461	6, 279, 016	743, 051	3, 316, 496
Redeposits:				
Fine bars.....	889, 618	1, 086, 867	197, 249	.....
Mint bars	1, 108, 715	1, 507, 457	398, 742	.....
Unparted bars	957, 687	1, 302, 957	345, 270	.....
Total redeposits.....	2, 956, 020	3, 897, 281	941, 261	.....
Total gold operated upon.....	11, 808, 481	10, 176, 297	1, 684, 312	3, 316, 496
Net decrease				1, 632, 184

TABLE SHOWING THE VALUE OF THE DEPOSITS AND REDEPOSITS OF GOLD BULLION AT THE MINTS AND ASSAY OFFICES OF THE UNITED STATES DURING THE CALENDAR YEARS 1898 AND 1899, WITH THE INCREASE OR DECREASE OF THE SAME DURING THE LATTER YEAR.

Classification of deposits of gold bullion.	Calendar year.		Increase.	Decrease.
	1898.	1899.		
Domestic bullion, unrefined	\$18, 123, 667	\$20, 661, 571	\$2, 537, 904	.....
Domestic bullion, refinery bars	16, 557, 360	16, 306, 511	.....	\$250, 849
Domestic bullion, refined	39, 803, 232	44, 679, 040	4, 875, 808	.....
Total domestic bullion.....	74, 484, 259	81, 647, 122	7, 413, 712	250, 849
Domestic coin, Treasury transfers.....	549, 115	336, 054	.....	213, 061
Domestic coin purchased	769, 601	1, 033, 025	263, 424	.....
Foreign bullion, unrefined.....	10, 698, 110	18, 163, 768	7, 465, 658	.....
Foreign bullion, refined	36, 503, 522	6, 344, 746	.....	30, 158, 776
Foreign coin, melted.....	57, 067, 064	19, 131, 710	.....	37, 935, 354
Jewelers' bars, etc	2, 924, 931	3, 142, 357	217, 426	.....
Total deposits.....	182, 996, 602	129, 798, 782	15, 360, 220	68, 558, 040
Redeposits:				
Fine bars	18, 390, 045	22, 467, 528	4, 077, 483	.....
Mint bars	22, 919, 165	31, 161, 908	8, 242, 743	.....
Unparted bars	19, 797, 141	26, 934, 505	7, 137, 364	.....
Total redeposits.....	61, 106, 351	80, 563, 941	19, 457, 590	.....
Total gold operated upon.....	244, 102, 953	210, 362, 723	34, 817, 810	68, 558, 040
Net decrease				33, 740, 230

DEPOSITS OF SILVER.

Silver is coined in the United States on Government account only. Deposits of silver bullion are received by the mints and assay offices of the United States for return to the depositor in fine or unparted bars with the weight and fineness stamped thereon. The deposits of silver for return in fine bars are confined almost exclusively to the New York assay office, only a small amount being deposited at other institutions. Fine silver bars manufactured for depositors are either exported or sold for use in the industrial arts in the United States.

The deposits of silver at the mints and assay offices during the calendar year 1899 were 10,427,428 fine ounces, of the coining value of \$13,481,927, and the redeposits contained 15,629,899 fine ounces of the coining value of \$20,208,354.

The domestic bullion amounted to 5,338,344 fine ounces, of the coining value of \$6,902,101. For the convenience of the Bureau, the domestic silver bullion has been classified as unrefined, refinery bars, and refined bars similar to domestic gold bullion.

The deposits and transfers of mutilated and uncurrent domestic silver coin amounted to 3,752,299 fine ounces, of the coining value of \$4,851,458, of which 3,749,229 fine ounces were received from the Treasury and 3,070 fine ounces purchased over the counter.

The deposits of foreign silver bullion amounted to 775,639 fine ounces of the value of \$1,002,846, of which 771,757 fine ounces represented the deposits of unrefined bullion and 3,882 fine ounces the deposits of refined bullion reported to have been received from countries named in the following statement:

DEPOSITS OF FOREIGN SILVER BULLION.

Country of production.	Fine ounces.	Coinage value.
UNREFINED.		
British Columbia	18,142	\$23,456
Northwest Territory	166,812	215,676
Ontario and Quebec	5,197	6,719
Nova Scotia	1,750	2,262
Manitoba	53	68
Canada unknown	839	1,085
Mexico	558,244	721,770
Cuba	1,407	1,820
Haiti	8	11
Central America	12,904	16,684
South America	6,386	8,257
New Zealand and South Africa	3	3
Philippine Islands	12	16
	771,757	997,827
REFINED.		
Mexico	3,882	5,019

The deposits of foreign silver coin received and melted contained 38,376 fine ounces, of the coining value of \$49,617, as shown by the following table:

Country of coinage.	Fine ounces.	Coinage value.
Spain	1,347	\$1,741
Mexico	7	9
South America	10,695	13,828
Central America	20,803	26,897
Other countries	27	34
Unknown	5,497	7,108
Total	38,376	49,617

REDEPOSITS OF SILVER.

The redeposits of silver bullion at the mints and assay offices contained 15,629,899 fine ounces, of the coining value of \$20,208,354, of which 15,237,648 fine ounces were in fine bars, 88,751 fine ounces in standard bars, 14,523 fine ounces in unparted bars, and 288,977 fine ounces in mint bars, as shown by the following statements:

UNPARTED SILVER BARS.

Institution at which manufactured.	Institution at which redeposited.					
	Philadel- phia.	San Fran- ciseo.	New York.	Denver.	Boise.	Total.
	<i>Fine ozs.</i>	<i>Fine ozs.</i>	<i>Fine ozs.</i>	<i>Fine ozs.</i>	<i>Fine ozs.</i>	<i>Fine ozs.</i>
Carson		18,548				18,548
Denver.....	60,676			30		60,706
Boise.....	22,153		3		2,752	24,908
Helena.....	28,450		88			28,538
Charlotte	1,006					1,006
St. Louis	875					875
Deadwood	1,979					1,979
Seattle	6,506	145,911				152,417
Total.....	121,645	164,459	91	30	2,752	288,977

Included in the above is 0.61 of an ounce of silver contained in a gold bar made by the assay office at St. Louis and deposited at the mint at New Orleans:

FINE STANDARD AND MINT SILVER BARS.

Institution at which manufactured.	Institution at which redeposited.					
	Fine bars.				Mint bars.	Standard bars.
	Philadel- phia.	San Fran- ciseo.	New Or- leans.	New York.	Philadel- phia.	New Or- leans.
	<i>Fine ozs.</i>	<i>Fine ozs.</i>	<i>Fine ozs.</i>	<i>Fine ozs.</i>	<i>Fine ozs.</i>	<i>Fine ozs.</i>
Philadelphia.....		3,480,688	11,591,812			932
San Francisco.....		2,048				
Carson		671				
New York.....	142,939		4,641	14,844	14,523	87,819
Total.....	142,939	3,483,407	11,596,453	14,844	14,523	88,751

The following tables show the deposits and redeposits of silver during the calendar year:

TABLE SHOWING THE WEIGHT OF THE DEPOSITS AND REDEPOSITS OF SILVER BULLION OF THE MINTS AND ASSAY OFFICES OF THE UNITED STATES DURING THE CALENDAR YEARS 1898 AND 1899, WITH THE INCREASE OR DECREASE OF THE SAME DURING THE LATTER YEAR.

Classification of deposits of silver bullion.	Calendar year.		Increase, 1899.	Decrease, 1899.
	1898.	1899.		
	<i>Fine ounces.</i>	<i>Fine ounces.</i>	<i>Fine ounces.</i>	<i>Fine ounces.</i>
Domestic bullion, unrefined	516,026	372,741		143,285
Domestic bullion, refinery bars	101,214	70,885		30,329
Domestic bullion, refined	4,653,735	4,894,718	240,983	
Total domestic bullion.....	5,270,975	5,338,344	240,983	173,614
Domestic coin, Treasury transfers	5,832,976	3,749,229		2,083,747
Domestic coin purchased	3,203	2,856		347
Trade dollars purchased	169	214	45	
Foreign bullion, unrefined.....	608,095	771,757	163,662	
Foreign bullion, refined.....	18,291	3,882		14,409
Foreign coin	21,091	38,376	17,285	
Jewelers' bars, old plate, etc	497,395	522,770	25,375	
Total deposits.....	12,252,195	10,427,428	447,350	2,272,117

TABLE SHOWING THE WEIGHT OF THE DEPOSITS AND REDEPOSITS OF SILVER BULLION OF THE MINTS AND ASSAY OFFICES OF THE UNITED STATES, ETC.—Continued.

Classification of deposits of silver bullion.	Calendar year.		Increase, 1899.	Decrease, 1899.
	1898.	1899.		
Redeposits:	<i>Fine ounces.</i>	<i>Fine ounces.</i>	<i>Fine ounces.</i>	<i>Fine ounces.</i>
Fine bars	6, 200, 397	15, 237, 648	9, 037, 251	.....
Mint bars .....	.....	14, 523	14, 523	.....
Standard bars.....	194, 125	88, 751	.....	105, 374
Unparted bars	243, 291	288, 977	45, 686	.....
Total redeposits.....	6, 637, 813	15, 629, 899	9, 097, 460	105, 374
Total silver operated upon	18, 890, 008	26, 057, 327	9, 544, 810	2, 377, 491
Net increase .....	.....	.....	7, 167, 319	.....

TABLE SHOWING THE VALUE OF THE DEPOSITS AND REDEPOSITS OF SILVER BULLION AT THE MINTS AND ASSAY OFFICES OF THE UNITED STATES DURING THE CALENDAR YEARS 1898 AND 1899, WITH THE INCREASE OR DECREASE OF THE SAME DURING THE LATTER YEAR.

Classification of deposits of silver bullion.	Calendar year.		Increase, 1899.	Decrease, 1899.
	1898.	1899.		
Domestic bullion, unrefined	\$667, 185	\$481, 928	.....	\$185, 257
Domestic bullion, refinery bars	130, 861	91, 649	.....	39, 212
Domestic bullion, refined.....	6, 016, 950	6, 328, 524	\$311, 574	.....
Total domestic bullion.....	6, 814, 996	6, 902, 101	311, 574	224, 469
Domestic coin, Treasury transfers	7, 541, 626	4, 847, 488	.....	2, 694, 138
Domestic coin purchased	4, 141	3, 698	.....	443
Trade dollars purchased	219	272	53	.....
Foreign bullion, unrefined	786, 224	997, 827	211, 603	.....
Foreign bullion, refined	23, 649	5, 019	.....	18, 630
Foreign coin.....	27, 269	49, 617	22, 348	.....
Jewelers' bars, old plate, etc.....	643, 098	675, 905	32, 807	.....
Total deposits.....	15, 841, 222	13, 481, 927	578, 385	2, 937, 680
Redeposits:	.....	.....	.....	.....
Fine bars	8, 016, 674	19, 701, 201	11, 684, 527	.....
Mint bars .....	.....	18, 777	18, 777	.....
Standard bars.....	250, 989	114, 749	.....	136, 240
Unparted bars	314, 559	373, 627	59, 068	.....
Total silver operated on	8, 582, 222	20, 208, 354	11, 762, 372	136, 240
Total redeposits	24, 423, 444	33, 690, 281	12, 340, 757	3, 073, 920
Net increase .....	.....	.....	9, 266, 837	.....

DEPOSITS OF GOLD AND SILVER SINCE 1880.

The following table shows the amount of gold and silver received at the mints and assay offices by calendar years since 1880:

GOLD AND SILVER (EXCLUDING REDEPOSITS) RECEIVED AT THE MINTS AND ASSAY OFFICES DURING THE CALENDAR YEARS SINCE 1880.

Calendar year.	Gold.	Silver (coin- ing value).	Total.
1880.....	\$100, 278, 703	\$35, 103, 825	\$135, 382, 528
1881.....	98, 763, 426	30, 326, 848	129, 090, 274
1882.....	41, 921, 263	35, 161, 254	77, 082, 517
1883.....	51, 089, 456	36, 978, 184	88, 067, 640
1884.....	50, 518, 179	36, 670, 731	87, 188, 910
1885.....	44, 714, 052	35, 836, 725	80, 550, 777
1886.....	66, 422, 088	39, 086, 070	105, 508, 158
1887.....	74, 724, 077	46, 381, 333	121, 105, 410
1888.....	41, 496, 410	41, 323, 973	82, 820, 383
1889.....	42, 599, 206	41, 977, 265	84, 576, 471
1890.....	48, 767, 964	55, 198, 037	103, 966, 001
1891.....	60, 849, 552	70, 994, 120	131, 843, 672
1892.....	45, 406, 646	84, 591, 898	129, 998, 544
1893.....	69, 419, 223	62, 465, 005	131, 884, 228
1894.....	49, 704, 902	14, 120, 605	63, 825, 507
1895.....	69, 433, 579	13, 843, 636	83, 277, 215
1896.....	91, 743, 670	10, 873, 160	102, 616, 830
1897.....	87, 924, 232	12, 707, 128	100, 631, 360
1898.....	182, 996, 602	15, 841, 222	198, 837, 824
1899.....	129, 798, 782	13, 481, 927	143, 280, 511

COINAGE OF THE UNITED STATES.

The following table exhibits the number of fine ounces and value of gold and silver coinage of the United States, by calendar years, since 1873:

COINAGE OF GOLD AND SILVER OF THE MINTS OF THE UNITED STATES SINCE 1873.

Calendar year.	Gold.		Silver.	
	Fine ounces.	Value.	Fine ounces.	Coining value.
1873	2,758,475	\$57,022,748	3,112,891	\$4,024,748
1874	1,705,441	35,254,630	5,299,421	6,851,777
1875	1,594,050	32,951,940	11,870,635	15,347,893
1876	2,253,281	46,579,453	18,951,777	24,503,308
1877	2,128,493	43,999,864	21,960,246	28,393,045
1878	2,408,400	49,786,052	22,057,548	28,518,850
1879	1,890,499	39,080,080	21,323,498	27,569,776
1880	3,014,163	62,308,279	21,201,232	27,411,694
1881	4,685,162	96,850,890	21,609,970	27,940,164
1882	3,187,317	65,887,685	21,635,469	27,973,132
1883	1,414,581	29,241,990	22,620,701	29,246,968
1884	1,160,601	23,991,756	22,069,935	28,534,866
1885	1,343,519	27,773,012	22,400,433	28,962,176
1886	1,400,240	28,945,542	24,817,064	32,086,709
1887	1,159,664	23,972,383	27,218,101	35,191,081
1888	1,518,046	31,380,808	25,543,242	33,025,606
1889	1,035,899	21,413,931	27,454,465	35,496,683
1890	990,100	20,467,182	30,320,999	39,202,908
1891	1,413,614	29,222,005	21,284,115	27,518,857
1892	1,682,832	34,787,223	9,777,084	12,641,078
1893	2,757,231	56,997,020	6,808,413	8,802,797
1894	3,848,045	79,546,160	7,115,896	9,200,351
1895	2,883,941	59,616,358	4,407,055	5,698,010
1896	2,276,192	47,053,060	17,858,594	23,089,899
1897	3,677,878	76,028,485	14,298,769	18,487,297
1898	3,772,561	77,985,757	17,815,385	23,034,033
1899	5,386,277	111,344,220	20,156,957	26,061,520
Total	63,346,502	1,309,488,513	490,989,895	634,815,226

In the Appendix a table will be found showing the value of the coinage executed by each mint annually since 1792.

The following table shows the number of pieces and value of coinage executed at the mints of the United States during the calendar year 1899:

COINAGE EXECUTED IN THE UNITED STATES, CALENDAR YEAR 1899.

Description.	Pieces.	Value.
Gold	9,103,115	\$111,344,220.00
Silver dollars	15,182,846	15,182,846.00
Subsidiary silver coin.....	49,024,442	10,878,673.90
Minor coin	79,629,062	1,837,451.86
Total	152,939,465	139,243,191.76

In addition to the domestic coinage, there were manufactured for the Government of Costa Rica the following gold coins:

Denominations.	Pieces.
Twenty-colone pieces	25,000
Ten-colone pieces	50,000
Five-colone picces.....	100,000
Total	175,000

There were also manufactured for the Government of Santo Domingo 241,414 silver pesos, which includes 1,019 imperfect pieces.

BARS MANUFACTURED, 1899.

The following table shows the character and value of gold and silver bars manufactured during the calendar year 1899:

Description.	Gold.	Silver.
Fine bars	\$45, 576, 620. 56	\$8, 061, 768. 35
Mint bars	6, 543, 154. 72	.....
Standard bars.....	2, 681, 816. 14	6, 641. 98
Unparted bars	26, 836, 455. 80	382, 767. 47
Total.....	81, 638, 047. 22	8, 451, 177. 80

PURCHASE OF SILVER.

The silver bullion purchased by the Government since November 1, 1893, when the purchasing clause of the act of July 14, 1890, was repealed, has been limited to the silver contained in deposits of gold bullion, silver fractions for return in fine bars, the amount retained in payment for charges on silver deposits, surplus bullion returned by the operative officers on the annual settlement at the close of the fiscal year, and uncurrent and mutilated domestic coins purchased under provisions of section 3526 of the Revised Statutes for the subsidiary silver coinage.

The quantity and cost of silver purchased for the subsidiary coinage during the calendar year 1899, was as follows:

TABLE SHOWING QUANTITY OF SILVER PURCHASED AT MINTS AND COST OF SAME FOR SUBSIDIARY COINAGE DURING THE CALENDAR YEAR 1899.

Stock.	Standard ounces.	Cost.
Partings, charges, and fractions purchased	a 1, 280, 127. 90	\$903, 385. 61
Amount transferred from silver recoinage account.....	.08	.09
Melted assay coins purchased.....	964. 36	1, 147. 43
Mutilated coins purchased.....	1, 816. 88	930. 39
Surplus bullion purchased.....	19, 700. 95	10, 394. 69
Total.....	1, 302, 610. 17	915, 858. 21

a Of this amount 689,906.46 standard ounces, costing \$592,517.20, were received by transfer from the United States assay office at New York.

TABLE SHOWING THE QUANTITY AND COST OF SILVER PURCHASED AT EACH MINT FOR SUBSIDIARY COINAGE DURING THE CALENDAR YEAR 1899.

Mints.	Standard ounces.	Cost.
Philadelphia.....	a 1, 031, 361. 19	\$776, 724. 26
San Francisco.....	257, 281. 54	131, 744. 05
New Orleans.....	12, 954. 36	6, 866. 48
Carson	1, 013. 08	523. 42
Total.....	1, 302, 610. 17	915, 858. 21

a Of this amount 689,906.46 standard ounces, costing \$592,517.20, were received by transfer from the United States assay office at New York.

AMOUNT, COST, AVERAGE PRICE, AND BULLION VALUE OF THE SILVER DOLLAR OF SILVER PURCHASED UNDER THE ACT OF FEBRUARY 28, 1878.

Fiscal year.	Fine ounces.	Cost.	Average price per fine ounce.	Bullion cost of a silver dollar.
1878	10,809,350.58	\$13,023,268.96	\$1.2048	\$0.9318
1879	19,248,086.09	21,593,642.99	1.1218	.8676
1880	22,057,862.64	25,235,081.53	1.1440	.8848
1881	19,709,227.11	22,327,874.75	1.1328	.8761
1882	21,190,200.87	24,054,480.47	1.1351	.8779
1883	22,889,241.24	25,577,327.58	1.1174	.8642
1884	21,922,951.52	24,378,383.91	1.1120	.8600
1885	21,791,171.61	23,747,460.25	1.0897	.8428
1886	22,690,652.94	23,448,960.01	1.0334	.7992
1887	26,490,008.04	25,988,620.46	.9810	.7587
1888	25,386,125.32	24,237,553.20	.9547	.7384
1889	26,468,861.03	24,717,853.81	.9338	.7222
1890	27,820,900.05	26,899,326.33	.9668	.7477
1891	2,797,379.52	3,049,426.46	1.0901	.8431
Total.....	291,272,018.56	308,279,260.71	1.0583	.8185

AMOUNT, COST, AVERAGE PRICE, AND BULLION VALUE OF THE SILVER DOLLAR OF SILVER PURCHASED UNDER ACT OF JULY 14, 1890.

Fiscal year.	Fine ounces.	Cost.	Average price per fine ounce.	Bullion cost of a silver dollar.
1891	48,393,113.05	\$50,577,498.44	\$1.0451	\$0.8083
1892	54,355,748.10	51,106,607.96	.9402	.7271
1893	54,008,162.60	45,531,374.53	.8430	.6520
1894	11,917,658.78	8,715,521.32	.7313	.5656
Total.....	168,674,682.53	155,931,002.25	.9244	.7150

AMOUNT, COST, AVERAGE PRICE, AND BULLION VALUE OF THE SILVER DOLLAR OF SILVER PURCHASED UNDER THE ACTS OF FEBRUARY 12, 1873, JANUARY 14, 1875, FEBRUARY 28, 1878, AND JULY 14, 1890.

Act authorizing.	Fine ounces.	Cost.	Average price per fine ounce.	Bullion cost of a silver dollar.
February 12, 1873	5,434,282.00	\$7,152,564.00	\$1.3162	\$1.0180
January 14, 1875	31,603,906.00	37,571,148.00	1.1888	.9194
February 28, 1878	291,272,018.56	308,279,260.71	1.0583	.8185
July 14, 1890	168,674,682.53	155,931,002.25	.9244	.7150
Total.....	496,984,889.09	508,933,974.96	1.0240	.7920

STATEMENT SHOWING THE AMOUNT AND COST OF SILVER BULLION PURCHASED UNDER ACT OF JULY 14, 1890, AND USED IN THE COINAGE OF STANDARD SILVER DOLLARS, WASTED AND SOLD IN SWEEPS, AND NUMBER OF DOLLARS COINED AND SEIGNIORAGE ON SAME, FROM AUGUST 13, 1890, TO JANUARY 1, 1900.

Disposition.	Fine ounces.	Cost.
Total amount purchased and cost of same.....	168,674,682.53	\$155,931,002.25
Used in coinage of standard silver dollars to January 1, 1900.....	79,031,729.39	74,817,939.85
Used in coinage of subsidiary silver to January 1, 1900	2,152,833.89	1,947,565.04
Wasted and sold in sweeps.....	63,570.37	62,535.64
Transferred to subsidiary silver bullion account	.31	.25
Total amount used.....	81,248,133.96	76,828,040.78
Balance on hand January 1, 1900	87,426,548.57	79,102,961.47
Total.....	168,674,682.53	155,931,002.25

STATEMENT SHOWING THE AMOUNT AND COST OF SILVER BULLION PURCHASED UNDER ACT OF JULY 14, 1890, AND USED IN THE COINAGE OF STANDARD SILVER DOLLARS, WASTED AND SOLD IN SWEEPS, AND NUMBER OF DOLLARS COINED AND SEIGNIORAGE ON SAME, FROM AUGUST 13, 1890, TO JANUARY 1, 1900—Continued.

Description.	Coinage	Seigniorage.
Standard silver dollars coined to January 1, 1900	\$102,182,438.00	\$27,364,498.15
Subsidiary silver coined to January 1, 1900	2,976,096.60	1,028,531.56

BALANCE OF SILVER BULLION PURCHASED UNDER ACT OF JULY 14, 1900, ON HAND AT EACH MINT, AND ASSAY OFFICE AT NEW YORK JANUARY 1, 1900.

Institutions.	Fine ounces.	Cost.
Mint at Philadelphia	82,188,475.17	\$74,363,679.79
Mint at San Francisco	1,388,905.12	1,256,606.87
Mint at New Orleans	3,228,252.47	2,920,873.38
Assay office at New York	620,915.81	561,801.43
Total	87,426,548.57	79,102,961.47

IMPORTS AND EXPORTS OF GOLD AND SILVER.

The aggregate value of the gold imported into the United States during the calendar year 1899 was \$51,334,964 as against \$158,142,993 for the calendar year 1898, or a decrease in importation of \$106,808,029 from the prior calendar year.

The total value of the gold bullion imported during the calendar year 1899 was \$12,780,139, received from various countries as follows: United Kingdom, \$5,420,979; British possessions in North America, \$3,262,854; Mexico, \$2,683,650; Central American States, \$567,296; British Australasia, \$372,950; South America, \$237,199; Germany, \$190,447, and the remainder was principally from France and the West Indies.

The value of the foreign gold coin imported during the year was \$19,675,107, of which amount \$12,081,153 came from British Australasia, \$3,793,717 from France, \$1,633,387 from the West Indies, \$759,022 from Japan, \$702,212 from the British possessions in North America, \$370,339 from the United Kingdom, \$155,050 from China, \$134,858 from South America, and the remainder from Mexico, the Central American States, Germany, Italy, and the Hawaiian Islands.

The value of the gold contained in foreign ores imported during the year was \$11,264,365, of which amount \$8,756,595 came from the British possessions in North America, \$1,708,239 from Mexico, \$581,369 from the United Kingdom, \$158,258 from British Australasia, and the remainder from France, Germany, Italy, Japan, Central and South America.

There was returned to the United States during the year, domestic gold coin of the value of \$7,615,353, received from various countries, as follows: From British Possessions in North America, \$5,621,710; West Indies, \$1,038,112; Mexico, \$324,224; Hawaiian Islands, \$207,416; Central American States, \$155,293; South America, \$73,191; China, \$72,875; Japan, \$58,660, and the remainder from the Azores and Madeira Islands and the United Kingdom.

GOLD IMPORTS, CALENDAR YEAR, 1899.

Description.	Amount.
Foreign bullion	\$12,780,139
Foreign coin	19,675,107
Gold in ore, etc.	11,264,365
Total foreign	43,719,611
United States coin	7,615,353
Total gold imports	51,334,964

EXPORTS OF GOLD.

The total value of the gold exported from the United States during the calendar year 1899 was \$45,379,411, of which amount \$40,783,134 was domestic and \$4,596,257 was foreign gold, showing an increase in gold exportation of \$29,070,736 over that of 1898.

The value of the United States assay office bars exported was \$1,502, the entire amount going to Mexico.

The value of other domestic gold bars exported during the year was \$282,758, of which \$275,334 went to the Dominion of Canada, \$4,050 to Germany, and \$3,374 to Hongkong.

The value of the domestic gold coin exported during the year was \$40,477,094, of which amount \$20,250,000 went to the United Kingdom, \$7,000,000 to France, \$4,539,086 to Canada, \$3,250,000 to Germany, \$2,778,640 to the Hawaiian Islands, \$2,047,457 to the West Indies, \$462,337 to South America, \$75,120 to Hongkong, \$49,244 to Central America, and the remainder to British Honduras, Japan, Samoa, and British Australasia.

The value of the gold contained in domestic ore exported was \$21,800, which went to Germany, the United Kingdom, and Canada.

Foreign gold coin of the value of \$4,555,731 was exported during the year, distributed as follows: To Cuba, \$3,939,263; France, \$397,580; Bermuda, \$975,550; Canada, \$94,046; Santo Domingo, \$16,759, and Venezuela, \$10,533.

Foreign gold bullion of the value of \$376 was exported, all of which went to Canada.

The value of the foreign gold contained in ore exported was \$40,150, all going to the Dominion of Canada.

GOLD EXPORTS, CALENDAR YEAR 1899.

Description.	Amount.
United States assay office bars	\$1,502
Other bullion	282,758
United States coin	40,477,094
Gold in ore, etc.	21,800
Total domestic	40,783,154
Foreign bullion reexported	\$376
Foreign coin reexported	4,555,731
Foreign gold ore, etc., reexported	40,150
	4,596,257
Total gold exports	45,379,411

SILVER IMPORTS.

The silver importation into the United States from all sources during the calendar year 1899 aggregated \$30,843,929, being an increase over the imports of the preceding calendar year of \$1,813,445.

The commercial value of the foreign silver bullion imported was \$4,775,067, of which amount \$4,155,082 came from Mexico, \$499,084 from Central America, and the remainder from various countries in small quantities.

The value of the foreign silver coin imported was \$3,858,583; of this amount Mexico furnished \$2,353,424, the West Indies \$523,490, Central America \$500,265, British Honduras \$230,339, and South America \$168,518.

United States silver coin of the value of \$307,192 was returned to the country during the year, of which amount \$99,846 came from Canada, \$81,844 from the West Indies, \$70,000 from the Philippine Islands, and \$30,000 from China.

Foreign silver ore imported contained \$21,903,087, of which \$19,022,820 came from Mexico, \$1,694,478 from the Dominion of Canada, \$714,347 from South America, \$311,149 from England, \$110,434 from British Australasia, and \$40,707 from Central American States.

SILVER IMPORTS, CALENDAR YEAR 1899.

Description.	Amount.
Foreign bullion	\$4, 775, 067
Foreign coin.....	3, 858, 583
Silver in ore, etc.....	21, 903, 087
Total foreign	30, 536, 737
United States coin.....	307, 192
Total silver imports	30, 843, 929

SILVER EXPORTS.

The aggregate value of the silver exported during the calendar year 1899 was \$53,498,592, of which amount \$50,552,359 represented the domestic and \$2,946,233 the foreign exports.

Domestic silver bullion of the value of \$49,785,082 was exported during the year, of which amount \$43,472,156 went to the United Kingdom, \$2,786,500 to Hongkong, \$2,256,595 to France, \$1,144,102 to China, and the remainder to Canada, Central and South America, and British Africa.

The value of the silver contained in the domestic ore exported was \$76,350, going principally to the United Kingdom.

Domestic silver coin of the value of \$690,927 was exported during the year as follows: To the West Indies, \$480,360; to Hawaii, \$159,360; to Canada, \$48,857, and to Germany, \$2,300.

There was exported during the year foreign silver coin of the value of \$2,946,171, of which amount \$1,841,036 went to Hongkong, \$497,900 to the United Kingdom, \$252,952 to the West Indies, \$106,550 to Canada, \$93,332 to South America, \$100,693 to Central American States, and \$45,200 to Mexico.

The value of the foreign silver bullion exported amounted to only \$62, going to Canada.

SILVER EXPORTS, CALENDAR YEAR 1899.

Description.	Amount.
Silver bullion	\$49,785,082
United States coin	690,927
Silver in ore, etc.	76,350
Total domestic	50,552,359
Foreign bullion reexported	\$62
Foreign coin reexported	2,946,171
	2,946,233
Total silver exports	53,498,592

In the above table the item "exported silver ore \$76,350," ascertained by the Bureau of the Mint from exporters, has been substituted for the amounts reported by the collectors of customs, for reasons stated in the following letters from collectors of customs at the ports of New York and Baltimore and from the superintendent of the assay office at New York.

THE UNITED STATES ASSAY OFFICE AT NEW YORK,
SUPERINTENDENT'S OFFICE,
February 19, 1900.

STATEMENT SHOWING THE AMOUNT OF GOLD AND SILVER CONTAINED IN PIG COPPER AND COPPER MATTE EXPORTED FROM THE PORT OF NEW YORK DURING THE CALENDAR YEAR ENDED DECEMBER 31, 1899.

Description.	Gross weight.	Gold.	Silver.
	<i>Avoirdupois pounds.</i>	<i>Fine ounces.</i>	<i>Fine ounces.</i>
Pig copper.....	2,296,000	258	65,300
Copper matte.....	1,781,183	328	61,950
Total	4,077,183	586	127,250

ANDREW MASON, *Superintendent.*

Hon. GEO. E. ROBERTS,
Director of the Mint, Washington, D. C.

OFFICE OF THE COLLECTOR OF CUSTOMS,
Port of New York, June 19, 1900.

SIR: In reply to your inquiry of the 11th instant, relative to the amount of gold and silver contained in pig copper, copper matte, etc., exported from this port during the calendar year ending December 31, 1899, I would state that such amount of gold and silver was as follows:

	Ounces.
Gold	881
Silver	61,519

Respectfully,

The DIRECTOR OF THE MINT,
Washington, D. C.

G. R. BIDWELL, *Collector.*

OFFICE OF THE COLLECTOR OF CUSTOMS,
Port of Baltimore, Md., June 14, 1900.

SIR: In compliance with your letter of the 11th instant, I have the honor to state that the records of this office do not indicate that any gold and silver contained in pig copper, copper matte, etc., was exported from this port during the calendar year ended December 31, 1899.

Respectfully, yours,

A. LINCOLN DRYDEN,
Special Deputy Collector.

HON. GEO. E. ROBERTS,
Director of the Mint, Treasury Department, Washington, D. C.

In the Appendix will be found tables exhibiting the imports and exports of the precious metals, by customs districts and by countries, for the calendar year 1899, kindly compiled by the Bureau of Statistics for use in this report.

MOVEMENT OF GOLD FROM THE UNITED STATES.

The superintendent of the United States assay office at New York has kindly prepared the following tables, giving exports of gold through the port of New York during the calendar year 1899:

STATEMENT OF UNITED STATES GOLD COIN AND GOLD BULLION EXPORTED FROM THE PORT OF NEW YORK TO EUROPE DURING THE CALENDAR YEAR ENDED DECEMBER 31, 1899.

Date.	Country.	Amount.	Rate of ex- change.
1899.			
June 2.....	England.....	\$1, 225, 000	\$4. 88
June 5.....	Germany.....	1, 000, 000	4. 88
June 6.....	England.....	500, 000	4. 88
June 9.....	do.....	1, 000, 000	4. 87½
Do.....	France.....	2, 000, 000	4, 87½
June 12.....	Germany.....	2, 000, 000	4. 87½
June 16.....	France.....	1, 000, 000	4. 87½
June 23.....	do.....	2, 000, 000	4. 88
Do.....	England.....	3, 250, 000	4. 88
June 26.....	do.....	3, 050, 000	4. 88
June 30.....	France.....	2, 000, 000	4. 87½
July 3.....	Germany.....	250, 000	4. 87½
December 15.....	England.....	2, 450, 000	4. 87½
December 19.....	do.....	500, 000	4. 87½
December 22.....	do.....	4, 925, 000	4. 87½
December 26.....	do.....	500, 000	4. 87½
December 29.....	do.....	2, 850, 000	4. 87½
Total.....		30, 500, 000	

RECAPITULATION OF GOLD EXPORTS TO EUROPE.

Description.	England.	France.	Germany.	Grand total of exports to Europe.
United States coins.....	\$20, 250, 000	\$7, 000, 000	\$3, 250, 000	
Foreign coins.....		397, 580		
Total.....	20, 250, 000	7, 397, 580	3, 250, 000	\$30, 897, 580

During the same period there were shipped to Mexico, West Indies, and Central and South America the following:

United States coins.....	\$2, 567, 011
Foreign coins.....	4, 087, 817
Bullion (in ore).....	1, 502
Total.....	6, 656, 330
Grand total of exports.....	37, 553, 910

The imports of gold during the same period were as follows:

From Europe:	
United States coins.....	\$33, 578
Foreign coins	4, 135, 454
Foreign bullion	5, 625, 459
Contained in base bullion.....	602, 500
Total	\$10, 396, 991
From other ports:	
United States coins.....	1, 112, 947
Foreign coins	1, 779, 258
Foreign bullion.....	480, 791
Contained in base bullion.....	988, 677
Total	4, 361, 673
Grand total of imports.....	14, 758, 664

MARKET PRICE OF SILVER DURING THE CALENDAR YEAR 1899.

During the months of January, February, and March the London market price for silver 925M (British standard) was remarkably steady, the greatest variation being only three-eighths pence per ounce, viz, from 27 $\frac{1}{4}$ d. to 27 $\frac{5}{8}$ d. per ounce, the demand from France, Russia, India, and Straits Settlements offering a fair market.

Near the end of April, 1899, speculative operations on a large scale for a rise in the price of silver was inaugurated, and the rate advanced to 29d. per ounce, but having no apparent foundation upon which to rest, and Eastern exchange failing to respond, and in view of the further fact that the China banks resold on the rise at a profit silver due on contracts, and for future delivery, the movement was of short duration.

During the months of June and July and the first part of August the price ranged from 27 $\frac{5}{8}$ d. to 27 $\frac{3}{4}$ d.; from the latter figures the price declined, and in October reached 26 $\frac{5}{8}$ d. In November, upon a demand principally from Shanghai, the price advanced to 27 $\frac{5}{8}$ d., from which point there was a gradual decline to 27 $\frac{3}{8}$ d., the closing price for the year.

The average price for the calendar year 1899, based upon daily London advices, was 27.4409 pence, equivalent at par of exchange to \$0.60154 per ounce fine in United States money. At the lowest price during the year (26 $\frac{5}{8}$ d.), the equivalent in United States money of an ounce of fine silver was \$0.58365, and at the highest price (29d.), \$0.63571. At the lowest price of the year (26 $\frac{5}{8}$ d.), the bullion value of a silver dollar was \$0.45141; at the highest price (29d.), \$0.49168; and at the average price, \$0.46525.

At the highest price for silver during the year the commercial ratio of silver to gold was as 1 to 32.5; at the lowest price, 1 to 35.41, and at the average price, 1 to 34.36.

HIGHEST, LOWEST, AND AVERAGE PRICE OF SILVER BULLION AND VALUE OF A FINE OUNCE EACH MONTH DURING THE CALENDAR YEAR 1899.

Months.	High- est.	Lowest.	Average price per ounce, British standard, 0.925.	Equivalent value of a fine ounce with ex- change at par(\$4.8665).	Average monthly price at New York of ex- change on London.	Equivalent value of a fine ounce based on average monthly price and average rate of ex- change.	Average monthly New York price of fine bar silver.
1899.	<i>Pence.</i>	<i>Pence.</i>	<i>Pence.</i>				
January	27 ⁵ / ₈	27 ¹ / ₄	27.4275	\$0.60124	\$4.8470	\$0.59886	\$0.60215
February	27 ¹ / ₂	27 ³ / ₈	27.4349	.60140	4.8594	.60052	.60392
March	27 ⁵ / ₈	27 ³ / ₈	27.4760	.60230	4.8580	.60117	.60426
April	29	27 ³ / ₈	27.6575	.60628	4.8577	.60654	.60995
May	28 ⁵ / ₈	28	28.1490	.61706	4.8756	.61794	.62192
June	28	27 ¹ / ₁₆	27.7716	.60878	4.8800	.61040	.61366
July	27 ³ / ₄	27 ³ / ₈	27.7150	.60754	4.8743	.60853	.61170
August	27 ¹ / ₁₆	27 ¹ / ₈	27.6226	.60552	4.8633	.60509	.60847
September	27 ³ / ₈	26 ¹ / ₁₆	27.1490	.59513	4.8591	.59430	.59815
October	26 ¹ / ₁₆	26 ³ / ₈	26.6875	.58502	4.8666	.58465	.58966
November	27 ⁵ / ₁₆	26 ¹ / ₁₆	27.0340	.59279	4.8624	.59221	.59701
December	27 ⁵ / ₁₆	26 ¹ / ₁₆	27.1666	.59552	4.8708	.59585	.60000
Average			27.4409	0.60154	4.8645	0.60133	0.60507

Bullion value of a United States silver dollar.....	\$0.46525
Ratio of gold to silver	34.36

SILVER.

[From "The Statist," London, September 15, 1900, p. 413.]

* * * * *

The recent currency policy of the Indian government may be divided into three stages, and we are now apparently entering upon the third. The first was the closing of the mints. Instead of the immediate effect being dearth of currency, hoarded rupees came out from all quarters, and owing to the great divergence between the currency value of the rupee and its intrinsic value, people who had hoarded rupees turned them out and replaced them with bar silver. When the release of hoarded rupees came to an end the Indian government, with the maintenance of exchange, were able to accumulate gold, and by doing so they were able to release some crores of rupees in the currency department. This stage has now come to an end, and the currency requirements of the country are no longer met, either by the release of the hoarded silver or by the release of the rupees in the currency department. Hence, the third stage has come of the necessity of coining rupees. And this explains the fact of the free purchases made of silver, not only last year, but especially this year, by the Indian government. If, as seems likely, the natives of India will not take gold, the natural yearly growth in the demand for currency must be met by rupees.

THE PRECIOUS METALS IN 1899.

[From "The Australasian Insurance and Banking Record," February, 1900, p. 114.]

Messrs. Mocatta & Goldsmid's annual circular is as follows:
The past year has been somewhat uneventful so far as the silver market is concerned, and the price has remained remarkably steady, the range being from 28⁷/₈d., the highest quotation, to 26⁵/₈d., the lowest.
During the first three months the price varied only between 27⁵/₈d. and 27¹/₄d., but toward the end of April a good deal of speculative buying, took place, owing to the formation of an important smelting combination in New York, which was considered likely to regulate the output. The price consequently rapidly advanced from 27³/₁₆d. to 28⁷/₈d., which was touched on 28 April, and was the highest quotation of the year, the buying being so keen during this rise that three-eighth pence and even one-half pence above the official price is said to have been paid more than once.
By 5 May the rate had receded to 28d., and remained in that neighborhood until the middle of August, when it gradually fell to 27¹/₈d., which was quoted on the 31st of that month. There was no further decline of any importance after this until October, when considerable sales from the native state of Gwalior took place in India, and 26⁵/₈d., the lowest quotation of the year, was touched several times. Early in

November, owing to a sudden and unexpected demand for China, the price rallied to 27½d., and this demand being subsequently supported by India and the Straits, the market remained steady until nearly the close of the year.

Owing, however, to the dearth of money during the last three weeks, there has been very little business done, and the spot price has fallen to 26½d., with a slight premium for forward deliveries.

The shipments both to India and China during the past twelve months have been larger than during the previous year, amounting to about £7,000,000. The Continent, especially Russia, has again been a considerable buyer, but the total exports of silver are less than in 1898, this being chiefly due to the absence of any large buying for Spain, which was such an important factor last year.

The transactions in Mexican dollars have been exceptionally few, the Mexican exchange barely permitting any shipments to this side. The quotations for these can have therefore been almost nominal throughout the year, ranging between 27½d. and 26½d. per ounce.

The operations in gold have not been on so large a scale, the demand for export never having caused the price to rise above 77s. 10½d. per ounce standard, and during the greater part of the year it has been under 77s. 10d. The Bank of England raised their buying price on several occasions above that paid by the Continent, thereby producing considerable parcels, and up to the present has received about £16,800,000 in bars and coin, in addition to which about £2,000,000 in United States coin from America is said to have been secured by the bank. On the other hand, although no bar gold has been withdrawn during the year, about £10,000,000 in sovereigns has been taken from the bank chiefly for South America and the Cape.

The imports of gold during 1899, owing to the war in the Transvaal, which, of course, has prevented any shipments from the Cape during the last three months, have been less than in 1898 by over £12,000,000 sterling.

IMPORTS AND EXPORTS DURING THE PAST FIVE YEARS.

Years.	Gold.		Silver.	
	Imports.	Exports.	Imports.	Exports.
1895	£38,800,000	£20,400,000	£10,600,000	£9,865,000
1896	24,500,000	29,600,000	14,200,000	15,100,000
1897	29,200,000	29,300,000	16,845,000	17,000,000
1898	44,000,000	35,800,000	15,700,000	15,500,000
1899	31,500,000	21,000,000	13,500,000	13,400,000

STOCK OF MONEY IN THE UNITED STATES.

The stock of United States coin in the United States on January 1, 1900, was as follows:

OFFICIAL TABLE OF UNITED STATES COIN IN THE UNITED STATES JANUARY 1, 1900.

Items.	Gold.	Silver.	Total.
Estimated stock of coin January 1, 1900.....	\$805,749,329	\$545,305,272	\$1,351,054,601
Coinage, calendar year 1899.....	111,344,220	26,061,520	137,405,740
Total	917,093,549	571,366,792	1,488,460,341
Loss:			
Net exports of United States coin, calendar year 1899..	32,861,741	a 383,735	33,245,476
United States coin melted for recoinage, calendar year 1899	1,381,445	5,502,449	6,883,894
United States coin taken out in warships and transports for disbursement in Cuba, Porto Rico, and the Philippine Islands, not recorded at the custom-houses, calendar year 1899.....	8,250,000	b 1,702,950	9,952,950
United States coin used in the arts, calendar year 1899 (estimated)	1,500,000	100,000	1,600,000
Total	43,993,186	7,689,134	51,682,320
Estimated stock of coin January 1, 1900.....	873,100,363	563,677,658	1,436,778,021

a Of this amount \$120,000 were in standard silver dollars.

b Of this amount \$1,370,000 were in standard silver dollars.

Of the stock of silver coins on January 1, 1900, \$483,702,703 were in dollars, and \$79,974,955 were in subsidiary coins.

In the above table the item "United States coin melted for recoinage," the amounts represent nominal or face value.

In the Appendix a table will be found giving in detail the source from which these amounts were obtained.

On January 1, 1900, the cost value of the gold and silver bullion owned by the Government was as follows:

GOLD AND SILVER BULLION IN MINTS AND ASSAY OFFICES JANUARY 1, 1900.

Metal.	Cost value.
Gold.....	\$143,078,146
Silver.....	79,418,819
Total	222,496,965

On January 1, 1900, the Mercantile Safe Deposit Company, in New York City, had on deposit in its vaults 239,170 ounces, fine, of silver bullion, of the commercial value of \$143,502, which, added to the stock of bullion owned by the Government and the stock of coin in the United States, shows a total metallic stock as follows:

METALLIC STOCK, JANUARY 1, 1900.

Bullion and coin.	Value.
Gold.....	\$1,016,178,509
Silver (including amount held by Mercantile Safe Deposit Co.)	643,239,979
Total	1,659,418,488

The metallic stock on hand January 1, 1899, was as follows:

METALLIC STOCK, JANUARY 1, 1899.

Bullion and coin.	Value.
Gold.....	\$945,798,788
Silver.....	639,061,846
Total	1,584,860,534

The increase during the calendar year in the stock of gold was \$70,379,721, and silver \$4,178,133; a total increase of \$74,557,854.

The stock of metallic and paper money in the United States on January 1, 1900, was located as follows:

LOCATION OF THE MONEYS OF THE UNITED STATES JANUARY 1, 1900.

Moneys.	In Treasury.	Outside of Treasury.	Total.
Metallic:			
Gold bullion.....	\$143,078,146		\$143,078,146
Silver bullion.....	79,418,819	\$143,502	79,562,321
Gold coin.....	257,306,366	615,793,997	873,100,363
Silver dollars.....	413,408,832	70,293,871	483,702,703
Subsidiary silver coin.....	2,962,678	77,012,277	79,974,955
Total.....	896,174,841	763,243,647	1,659,418,488
Paper:			
Legal-tender notes, old issue.....	29,944,430	316,736,586	346,681,016
Legal-tender notes, act July 14, 1890.....	1,439,728	86,880,552	88,320,280
Gold certificates.....	23,315,594	161,529,025	184,844,619
Silver certificates.....	6,516,806	394,947,698	401,464,504
National-bank notes.....	4,283,540	211,993,682	246,277,222
Currency certificates.....	370,000	12,440,000	12,810,000
Total.....	65,870,098	1,214,527,543	1,280,397,641
Grand total.....	962,044,939	1,977,771,190	2,939,816,129

GOLD AND SILVER USED IN INDUSTRIAL ARTS IN THE UNITED STATES DURING THE CALENDAR YEAR 1899.

In reply to inquiries made by this Bureau for the purpose of ascertaining the amount of precious metals used in industrial arts in the United States during the calendar year 1899, the following summary of the statements received is submitted.

The quantity and value of the gold and silver bars sold manufacturers and jewelers by the United States Mint at Philadelphia during the calendar year 1899 was as follows:

VALUE AND COMPOSITION OF BARS MANUFACTURED FOR USE IN THE INDUSTRIAL ARTS BY THE UNITED STATES MINT AT PHILADELPHIA DURING THE CALENDAR YEAR ENDED DECEMBER 31, 1899.

Material used.	Bars manufactured.			
	Gold.		Silver.	
	Fine ounces.	Value.	Fine ounces.	Coining value.
Domestic bullion.....	69,520.894	\$1,437,124.41	13,671.04	\$17,675.68
Jewelry, etc.....	4,176.108	86,327.81	51,883.36	67,081.52
United States coin.....	1,132.178	23,404.21	208.23	269.23
Foreign coin.....			223.69	289.22
Total.....	74,829.180	1,546,856.43	65,986.32	85,315.65

The quantity and value of the gold and silver bars sold manufacturers and jewelers by the United States assay office at New York during the calendar year 1899 was as follows:

STATEMENT OF GOLD AND SILVER BARS MANUFACTURED FOR USE IN THE INDUSTRIAL ARTS BY THE UNITED STATES ASSAY OFFICE AT NEW YORK DURING THE CALENDAR YEAR ENDED DECEMBER 31, 1899.

Material used.	Gold.		Silver.	
	Fine ounces.	Value.	Fine ounces.	Coining value.
Domestic bullion.....	538,645.473	\$11,134,790.13	5,068,873.81	\$6,553,695.43
United States coin.....			259.78	335.88
Foreign material.....	16,657.918	344,349.71	528,906.11	683,838.19
Old jewelry, etc.....	89,285.352	1,659,645.54	425,303.71	549,887.63
Total.....	635,588.743	13,138,785.38	6,023,343.41	7,787,757.13

The quantity and value of the gold and silver bars sold to manufacturers and jewelers by the private refineries in the United States during the calendar year 1899 was as follows:

BARS FOR INDUSTRIAL USE FURNISHED GOLDSMITHS AND OTHERS BY PRIVATE REFINERIES DURING THE CALENDAR YEAR 1899.

Material used.	Gold.		Silver.	
	Fine ounces.	Value.	Fine ounces.	Coining value.
Domestic bullion, exclusive of United States bars.....	33, 639	\$695, 373	4, 852, 989	\$6, 274, 571
United States bars	133, 194	2, 753, 362	1, 698, 282	2, 195, 759
United States coin	9, 381	193, 915	.....	.....
Foreign material	27	556	8	10
Old plate, jewelry, and other old material	47, 843	989, 012	1, 106, 491	1, 430, 615
Total.....	224, 084	4, 632, 218	7, 657, 770	9, 900, 955

Firms addressed.....	81
Firms replying	60
Firms manufacturing	37
Firms not manufacturing	23

Of the bars furnished by private refineries to manufacturers and jewelers for industrial use, \$2,753,362 in gold and \$2,195,759 in silver, were “United States bars”—that is, bars bearing the stamp of Government institutions, and, in order to avoid duplication, these amounts must be deducted from the totals reported by private refineries.

The following table exhibits the quantity and value of gold and silver bars sold manufacturers and jewelers by the private refineries in the United States, after eliminating the “United States bars,” during the calendar year 1899:

BARS FOR INDUSTRIAL USE, EXCLUSIVE OF UNITED STATES BARS, FURNISHED GOLDSMITHS AND OTHERS BY PRIVATE REFINERIES DURING THE CALENDAR YEAR 1899.

Material used.	Gold.		Silver.	
	Fine ounces.	Value.	Fine ounces.	Coining value.
Domestic bullion	33, 639	\$695, 373	4, 852, 989	\$6, 274, 571
United States coin	9, 381	193, 915	.....	.....
Foreign material.....	27	556	8	10
Old plate, jewelry, and other old material	47, 843	989, 012	1, 106, 491	1, 430, 615
Total.....	90, 890	1, 878, 856	5, 959, 488	7, 705, 196

The value of the gold and silver bars sold manufacturers and jewelers by Government institutions and private refineries was as follows:

GOLD AND SILVER BARS FURNISHED FOR USE IN MANUFACTURES AND THE ARTS DURING THE CALENDAR YEAR 1899.

Material used.	Gold.	Silver (coining value).	Total.
Domestic bullion	\$13, 267, 287	\$12, 845, 942	\$26, 113, 229
United States coin.....	217, 319	605	217, 924
Foreign material	344, 906	684, 137	1, 029, 043
Old material.....	2, 734, 985	2, 047, 584	4, 782, 569
Total	16, 564, 497	15, 578, 268	32, 142, 765

The actual amount of United States coin melted by goldsmiths and jewelers is not known, but assuming the total amount of gold coin used in the arts to be \$1,500,000, and silver coin \$100,000, the industrial con-

sumption of the precious metals in the United States during the calendar year 1899 would be as follows:

INDUSTRIAL CONSUMPTION OF THE PRECIOUS METALS DURING THE CALENDAR YEAR 1899.

Material used.	Gold.	Silver (coining value).	Total.
Domestic bullion.....	\$13,267,287	\$12,845,942	\$26,113,229
United States coin.....	1,500,000	100,000	1,600,000
Foreign material.....	344,906	684,137	1,029,043
Old material.....	2,734,985	2,047,584	4,782,569
Total.....	17,847,178	15,677,663	33,524,841

The following table exhibits the value of gold bars exchanged for gold coin by the United States mint at Philadelphia and assay office at New York, under the provisions of the act of May 26, 1882:

GOLD BARS EXCHANGED FOR GOLD COIN AT THE MINT AT PHILADELPHIA AND ASSAY OFFICE AT NEW YORK DURING THE CALENDAR YEAR 1899.

Months.	Philadelphia.	New York.	Total.
1899.			
January.....	\$65,000.00	\$578,844.37	\$643,844.37
February.....	70,000.00	599,595.37	669,595.37
March.....	90,000.00	795,536.11	885,536.11
April.....	75,000.00	610,380.50	685,380.50
May.....	85,000.00	768,350.88	853,350.88
June.....	70,000.00	745,039.48	815,039.48
July.....	80,000.00	682,217.29	762,217.29
August.....	176,044.54	758,379.99	934,424.53
September.....	145,469.69	1,016,713.46	1,162,183.15
October.....	195,962.68	964,577.99	1,160,540.67
November.....	216,558.91	979,806.24	1,196,365.15
December.....	166,050.01	597,017.63	763,067.64
Total.....	1,435,085.83	9,096,459.31	10,531,545.14

The following table shows the amounts and the classification of gold and silver used in the industrial arts in the United States each year since 1880:

GOLD AND SILVER BARS FURNISHED FOR USE IN MANUFACTURES AND THE ARTS, AND CLASSIFICATION OF THE MATERIAL USED, BY CALENDAR YEARS, SINCE 1880.

GOLD.

Calendar year.	United States coin.	New material.	Old material.	Foreign bullion and coin.	Total.
1880.....	\$3,300,000	\$6,000,000	\$395,000	\$1,267,600	\$10,962,600
1881.....	2,700,000	7,000,000	522,900	1,547,800	11,770,700
1882.....	2,500,000	7,000,000	696,500	671,500	10,868,000
1883.....	4,875,000	7,840,000	1,549,300	194,500	14,458,800
1884.....	5,000,000	6,000,000	3,114,500	385,500	14,500,000
1885.....	3,500,000	6,736,927	1,408,902	178,913	11,824,742
1886.....	3,500,000	7,003,480	1,928,046	638,003	13,069,529
1887.....	3,500,000	9,090,342	1,835,882	384,122	14,810,346
1888.....	3,500,000	9,893,057	2,402,976	718,809	16,514,842
1889.....	3,500,000	9,686,827	3,218,971	291,258	16,697,056
1890.....	3,500,000	10,717,472	3,076,426	362,062	17,655,960
1891.....	3,500,000	10,697,679	4,860,712	628,525	19,686,916
1892.....	3,500,000	10,588,703	4,468,685	771,686	19,329,074
1893.....	1,500,000	8,354,482	2,777,165	804,254	13,435,901
1894.....	1,500,000	6,430,073	2,184,946	543,585	10,658,604
1895.....	1,500,000	8,481,789	2,976,269	471,027	13,429,085
1896.....	1,500,000	7,209,787	2,369,343	316,804	11,395,934
1897.....	1,500,000	7,184,822	2,571,428	613,981	11,870,231
1898.....	1,500,000	9,463,262	2,164,976	437,641	13,565,879
1899.....	1,500,000	13,267,287	2,734,985	344,906	17,847,178
Total.....	56,875,000	168,645,989	47,257,912	11,572,476	284,351,377

GOLD AND SILVER BARS FURNISHED FOR USE IN MANUFACTURES AND THE ARTS, AND
CLASSIFICATION OF THE MATERIAL USED, ETC.—Continued.

SILVER (COINING VALUE.)

Calendar year.	United States coin.	New material.	Old material.	Foreign bullion and coin.	Total.
1880.....	\$600,000	\$5,000,000	\$145,000	\$353,000	\$6,098,000
1881.....	200,000	5,900,000	178,000	371,000	6,649,000
1882.....	200,000	6,344,300	212,900	440,300	7,197,500
1883.....	200,000	4,623,700	561,900	155,000	5,540,600
1884.....	200,000	4,500,000	170,000	650,000	5,520,000
1885.....	200,000	4,539,875	462,186	62,708	5,264,769
1886.....	200,000	3,626,195	404,155	825,615	5,055,965
1887.....	200,000	4,102,734	480,606	654,991	5,438,331
1888.....	200,000	6,477,857	652,047	771,985	8,101,889
1889.....	200,000	7,297,933	611,015	657,997	8,766,945
1890.....	200,000	7,143,635	640,100	1,245,419	9,229,154
1891.....	200,000	7,289,073	858,126	1,256,101	9,603,300
1892.....	200,000	7,204,210	647,377	1,249,801	9,301,388
1893.....	100,000	6,570,737	1,222,836	1,740,704	9,634,277
1894.....	100,000	8,579,472	1,221,177	982,399	10,883,048
1895.....	100,000	9,825,387	1,378,136	973,501	12,277,024
1896.....	100,000	7,965,449	1,076,829	1,061,995	10,204,273
1897.....	100,000	9,200,497	1,103,460	797,193	11,201,150
1898.....	100,000	10,176,784	949,312	632,449	11,858,545
1899.....	100,000	12,845,942	2,047,584	684,137	15,677,663
Total	3,700,000	139,213,780	15,022,746	15,566,295	173,502,821

THE WORLD'S INDUSTRIAL CONSUMPTION.

Since 1893 this Bureau has endeavored to obtain, through the United States representatives abroad, official estimates from the various countries of the world, of the consumption of precious metals in the arts and industries.

The results of these inquiries, though at times incomplete, are considered sufficiently full and accurate to encourage renewed efforts.

The interrogatories sent out by this Bureau for 1899 were as follows:

What was the weight of fine gold used in the industrial arts during the calendar year 1899?

What amount of this was new gold, what amount old gold, and what amount coins?

What was the weight of fine silver used in the industrial arts during the calendar year 1899?

What amount of this was new silver, what amount old silver, and what amount coins?

The following verbatim replies of all countries as to their consumption of precious metals in the arts during 1899 is submitted, together with such other matter relative to the question as was assumed to be of value:

From Australasia.—New South Wales: “No information obtainable.” New Zealand: “No information.” Victoria: “Impossible to estimate; no records available.”

From Austria-Hungary.—Austria: “The jewelry, fancy articles, wire, etc., brought to the Imperial Stamping Office, in Vienna, to be stamped during the year 1899, show the domestic consumption of gold to have been as follows:

GOLD.

[Interrogatory No. 4.]

Items.	Gross weight.	At the average standard of 1898, per kilogram.	In fine gold.
	<i>Kilograms.</i>		<i>Kilograms.</i>
Domestic articles of gold.....	4,471.537	.585106	2,616.323
Domestic double (plated) wares—that is, the gold placed on the same.....			3.467
Wire—that is, the amount of gold placed upon the silver wire shown in the reply to interrogatory No. 6.....			31.612
Total.....			2,651.402

“No data are given as yet showing the amount of gold consumed during the year 1899 for other industrial uses, especially in the gilding by fire and galvanism.

“Of the articles of gold brought to the Imperial Stamping Office, in Vienna, to be stamped, as shown in the reply to interrogatory No. 4, it is assumed that 26 per cent were manufactured of old articles of gold, and this assumption would show that there were used, in the year 1899, 1,962.037 kilograms (1000/1000) new gold, and 689.365 kilograms (1000/1000) old gold. The articles brought to the Imperial Stamping Office during the year 1899, to be stamped, show the domestic consumption of silver to have been as follows:

SILVER.

[Interrogatory No. 6.]

Items.	Gross weight.	At the average standard of 1898, per kilogram.	In fine silver.
	<i>Kilograms.</i>		<i>Kilograms.</i>
Domestic articles of silver.....	54,410.588	0.7951	43,261.859
Domestic wire.....			2,298.830
Total.....			45,560.689

“No data are given as yet showing the amount of silver consumed during the year 1899 for other industrial uses.

“Of the articles of silver brought to the Imperial Stamping Office, in Vienna, to be stamped during the year 1899, it is assumed that 20 per cent were manufactured of old articles of silver, and this assumption would show that there were used 36,448.551 kilograms (1000/1000) new silver and 9,112.138 kilograms (1000/1000) old silver.”

Hungary: “No data are on hand showing the amount of gold and silver used for industrial purposes. There were presented at the Royal Hungarian Stamping Office, for the purpose of being officially stamped—

A.—Domestic goods.

	Kilograms.
(1) Gold ware.....	1,363.433
(2) Silverware.....	9,930.871
(3) Gilt wire.....	654.538
(4) Silver wire.....	409.756

B.—Foreign goods.

	Kilograms.
(5) Foreign gilt wire	6. 940
(6) Foreign gold watches	179. 115
(7) Other foreign gold ware	112. 381
(8) Silver watches	1, 102. 625
(9) Other foreign silver ware	1, 686. 473

“0.613 kilograms fine gold and 16.288 kilograms fine silver were used for the coinage of medals.”

The amount used for “other industrial purposes” is not given; but in 1897 an amount equal to 17 per cent in gold and 24 per cent in silver of the articles stamped was added for “other industrial purposes.” Following this custom, the total net consumption was as follows:

Items.	Kilograms, fine.	
	Gold.	Silver.
Austria.....	2, 651. 402	45, 560. 689
Hungary.....	2, 317. 020	13, 146. 013
Total.....	4, 968. 422	58, 706. 702
In addition, for “other industrial purposes”.....	844. 632	14, 089. 608
Total consumption	5, 813. 054	72, 796. 310
Less “old material”	1, 511. 394	14, 559. 262
Net consumption, “new material”	4, 301. 660	58, 237. 048
Coining value (United States money)	\$2, 858, 883	\$2, 420, 332

From Belgium.—“Since the promulgation of the law of June 5, 1868, granting the free working of precious metals, it is impossible to give the figures for the weight of gold and silver used in the industrial arts.” As there are no figures in the above information on which to base a calculation, the figures for 1898—gold 2,543 and silver 20,000 kilograms (the estimate for silver is that of Professor Lexis in 1895)—are adopted for 1899.

From Bolivia.—“There is no official record and no report exists.”

From Costa Rica.—“The amount of gold and silver used in the industrial arts in Costa Rica during 1899 was very insignificant. No estimates of value can be given.”

From Denmark.—“Minister of finance unable to give any information.”

From Dutch Guiana.—“The quantity of gold and silver used in the industrial arts is not known.”

From France.—“Gold, about 27,000 kilograms of fine gold. No information as to new or old gold. Silver, about 235,000 kilograms new silver.” (Dr. Soetbeer, in his estimates for the industrial consumption in France, calculated that 20 per cent of it was old gold.) This would give 21,600 kilograms of new material for the gold consumption.

From Germany.—“Gold: Investigations regarding these have been thus far only made for 1896 and 1897, the results of which will be found in the answers for the calendar year 1898, attached hereto.

“Silver: These questions can not be answered, as no official investigations have been made in regard to them.” Therefore the figures for 1898 are repeated for 1899.

From Great Britain.—"No information available."

The Bureau of the Mint has received no official information as to the industrial gold consumption of England in 1899, and recourse is therefore had, as last year, to an estimate of the same. According to the memorandum by Mr. W. Chandler Roberts-Austen, chemist and assayer, published in the reports of the deputy master of the royal mint, London, the number of ounces of gold wares assayed and marked by the wardens of the assay offices at Birmingham and Chester annually from 1889 was as follows:

Years.	Birmingham.	Chester.	Total.
	<i>Troy ounces.</i>	<i>Troy ounces.</i>	<i>Troy ounces.</i>
1889.....	158,769	41,883	200,652
1890.....	193,426	51,166	244,592
1891.....	230,136	53,715	283,851
1892.....	228,018	55,789	283,807
1893.....	229,016	61,318	290,334
1894.....	223,759	62,442	286,201
1895.....	239,472	73,283	312,755
1896.....	283,423	97,281	380,704
1897.....	311,335	109,187	420,522
1898.....	333,741	130,480	464,221
1899.....	362,481	148,895	511,376

These figures are far from representing the total industrial gold consumption of the United Kingdom, which must, if we are to be guided by earlier estimates, be placed at, at least, twice these amounts.

Professor Lexis estimated it to have been in 1895 500,000 ounces, or about 15,500 kilograms net.

The wares stamped have increased 63 per cent since that date, equal to an increase of 9,765 kilograms, which, after deducting 25 per cent for old material, would give a net increase of 7,324 kilograms; hence this Bureau estimates the consumption for 1899 at 22,824 kilograms.

No official estimate for silver has been received, and hence the report of Mr. Roberts-Austen of the amounts stamped at the assay office is given.

Years.	Birmingham.	Sheffield.	Chester.	Total.
	<i>Ounces.</i>	<i>Ounces.</i>	<i>Ounces.</i>	<i>Ounces.</i>
1894.....	1,401,449	496,148	227,250	2,124,847
1895.....	1,796,056	715,248	311,624	2,822,928
1896.....	2,117,622	922,482	473,887	3,513,991
1897.....	2,303,157	974,477	556,801	3,834,435
1898.....	2,530,019	1,165,017	592,783	4,287,819
1899.....	2,823,525	1,323,917	741,044	4,888,486

Professor Lexis estimated the net silver consumption of England in 1895 at 140,000 kilograms. The wares stamped have increased 73 per cent since that date, equal to an increase of 102,200 kilograms, or 76,650 kilograms net (deduction of 25 per cent being made for old material). Hence this Bureau estimates the consumption for 1899 at 216.650 kilograms.

From Greece.—"Unknown."

From Haiti.—"No means of securing information."

From India.—"Gold: There are no data from which to make an estimate, except that it may be said that all the uncoined gold imported

is manufactured into plate and ornaments. Silver: Until the closure of the Indian mints, in June, 1873, practically all the silver imported into India (none is produced in the country) was coined either in the mints of the government or in those of the native states. Much of the coin was withdrawn annually from circulation, to be hoarded or converted into ornaments, but there are no data, except of the imports of silver during the period since the closure of the government mints, upon which to frame an estimate of the quantity actually so withdrawn. The import trade in silver was materially influenced until recently by speculation arising out of the special and transitory conditions which followed the closure of the mints, and the imports still form an uncertain basis on which to frame an estimate.

“It is not possible to say what proportion is hoarded in the form of rupees, or bars, or ingots, and what proportion was manufactured into ornaments and plate.”

From Japan.—“Not known.”

From Korea.—“No statistics.”

From Mexico.—“No information on these interrogatories.”

From the Netherlands.—“The estimated quantity of gold used in industrial works in 1899 is about 590 kilograms of fine gold. Amount of new or old gold is not known. The estimated quantity of silver used in industrial works is about 9,473 kilograms of fine silver, in 1899. Amount of new or old silver is not known.”

From Norway.—“As to the weight and value of the gold and silver used in the industrial arts during the year (1899) no information can be given.”

From Portugal.—“The industrial arts employed about 1,453 kilograms of gold and 8,273 kilograms of silver. This total is almost exclusively remelted gold and silver.” Deducting 20 per cent for old material, we have 1,162 kilograms for gold and 6,618 kilograms for silver.

From Russia.—Mr. Kovalevsky, director of the department of trade and manufactures in Russia, has kindly furnished the following tables showing the quantity of gold and silver presented to the different assay institutions for assay within the Empire of Russia for the years 1889 to 1898, inclusive:

GOLD PRESENTED FROM 1889 TO 1898, INCLUSIVE, TO THE LOCAL ASSAY INSTITUTIONS IN FORM OF ARTICLES AND BARS OF HOME AND FOREIGN MANUFACTURE.

Years.	Approximate weight of fine gold.					
	Articles.	Watch cases.	Metal leaf.	Thread.	Bars.	Total.
	Poods.	Poods.	Poods.	Poods.	Poods.	Poods.
1889	125 $\frac{3}{4}$	24 $\frac{3}{4}$	16 $\frac{3}{4}$	5 $\frac{1}{2}$	2 $\frac{1}{4}$	175
1890	140 $\frac{3}{4}$	26 $\frac{1}{2}$	19 $\frac{1}{2}$	6 $\frac{1}{2}$	2	195
1891	132 $\frac{1}{2}$	21 $\frac{3}{4}$	19 $\frac{3}{4}$	7 $\frac{1}{2}$	4 $\frac{1}{4}$	185
1892	121 $\frac{3}{4}$	14 $\frac{1}{2}$	16 $\frac{1}{2}$	8 $\frac{1}{4}$	1 $\frac{5}{8}$	163
1893	143 $\frac{1}{2}$	22 $\frac{1}{2}$	15 $\frac{1}{2}$	6 $\frac{1}{2}$	$\frac{6}{8}$	189
1894	162 $\frac{1}{2}$	29 $\frac{1}{2}$	20	6	1	219
1895	178 $\frac{3}{4}$	29 $\frac{1}{2}$	22 $\frac{1}{2}$	6 $\frac{1}{2}$	$\frac{5}{8}$	238
1896	199 $\frac{1}{2}$	65	24	6 $\frac{1}{2}$	$\frac{5}{8}$	296
1897	204 $\frac{1}{2}$	63 $\frac{1}{2}$	26	6 $\frac{1}{2}$	$\frac{5}{8}$	301
1898	216 $\frac{3}{4}$	75	26 $\frac{3}{4}$	5 $\frac{9}{16}$	$\frac{5}{8}$	325

SILVER PRESENTED FROM 1889 TO 1898, INCLUSIVE, TO THE LOCAL ASSAY INSTITUTIONS IN FORM OF ARTICLES AND BARS OF HOME AND FOREIGN MANUFACTURE.

Years.	Approximate weight of fine silver.					
	Articles.	Watch cases.	Metal leaf.	Thread.	Bars.	Total.
	<i>Poods.</i>	<i>Poods.</i>	<i>Poods.</i>	<i>Poods.</i>	<i>Poods.</i>	<i>Poods.</i>
1889	4,021 $\frac{1}{4}$	274	9 $\frac{3}{4}$	756 $\frac{3}{4}$	32 $\frac{1}{4}$	5,094
1890	3,743 $\frac{1}{4}$	294	8 $\frac{3}{4}$	715 $\frac{1}{2}$	51 $\frac{1}{4}$	4,813
1891	3,750	222	8 $\frac{1}{2}$	596 $\frac{1}{2}$	36	4,613
1892	3,831 $\frac{3}{4}$	192	6 $\frac{1}{4}$	549 $\frac{1}{2}$	47 $\frac{1}{2}$	4,627
1893	4,722 $\frac{1}{2}$	347	7 $\frac{1}{2}$	528	20	5,625
1894	6,091 $\frac{1}{2}$	417 $\frac{1}{2}$	8 $\frac{1}{4}$	653 $\frac{3}{4}$	15	7,186
1895	6,547	449	9	639 $\frac{1}{2}$	18 $\frac{1}{4}$	7,663
1896	6,796 $\frac{1}{4}$	468 $\frac{1}{4}$	7 $\frac{3}{4}$	819 $\frac{3}{4}$	12	8,104
1897	7,308	465	8 $\frac{3}{4}$	828 $\frac{1}{4}$	18 $\frac{1}{4}$	8,629
1898	8,017 $\frac{3}{4}$	487 $\frac{1}{2}$	8 $\frac{1}{4}$	810	15 $\frac{1}{4}$	9,339

According to the above tables, there were 325 poods, or 5,323.66 kilograms of fine gold, valued at \$3,538,104, and 9,339 poods, or 152,977.45 kilograms of fine silver, valued at \$6,357,743, presented at the different assay institutions in Russia during 1898 for assay and used in the manufacture of different articles.

After deducting 20 per cent of the amount of the gold, and 25 per cent of the amount of the silver, for old material used, we have 4,259 kilograms of gold and 114,733 kilograms of silver for the total amount of new material used.

It is assumed that an equal amount was used during 1899.

From San Salvador.—"No statistics can be obtained."

From Santo Domingo.—"Not known."

From Siam.—"Not known."

From South Africa.—Natal. "No record, and information not procurable."

From Spain.—"Unknown. There are no data."

From Sweden.—"The quantity of gold and silver annually used in Sweden in the industrial arts can hardly be stated exactly, but according to information given by the Royal Assay Office, the weight of the objects stamped there during the past year amounted to about 550 kilograms, fine gold, and 5,500 kilograms, fine silver. It is impossible to say how large a proportion of these amounts consisted of new gold or silver. For striking medals 10 kilograms gold, and 280 kilograms silver were used during the same year. For this purpose new gold and silver was exclusively used."

Following the method formerly pursued by this Bureau in estimating the annual amount of new gold used in the industrial arts in Sweden, by deducting 10 per cent for old material, we find the consumption of new gold to have been 505 kilograms, fine, and for new silver 5,230 kilograms, fine.

From Switzerland.—"The total weight of fine gold used in the industrial arts during the past year amounts to about 10,430 kilograms, equal to 36,000,000 francs. These figures are only approximative, as there does not exist in Switzerland any official compulsory control over jewelry.

"Of this quantity about 6,230 kilograms, equal to 21,500,000 francs, were new gold, and about 4,200 kilograms, equal to 14,500,000 francs, were old gold. The coins melted down by the manufacturers are included among the new gold; the exact proportion of these, however, can not be specified.

“Total weight of fine silver used in the industrial arts amounts to about 75,000 kilograms, equal to 7,550,000 francs—calculation based upon current values. Of this quantity about 55,000 kilograms, equal to 5,550,000 francs, were new silver, and about 20,000 kilograms, equal to 2,000,000 francs, old silver. As the melting of silver coins would mean, according to the current value, a loss to the manufacturers of 55 per cent, any such operation is, of course, out of the question.”

From Turkey.—“There are no statistics in the country permitting any answer to these questions. Eleven thousand two hundred English sovereigns, withdrawn from circulation, have been melted down for the manufacture of gold ornaments. (This amount—11,200 sovereigns—equals \$54,500, or 82 kilograms, fine, at which figure it is taken for 1899.)

For other countries.—For other countries the consumption of gold is estimated at 5,000 kilograms—following previous estimates of this Bureau—and of silver at 50,000 kilograms, being Dr. Soetbeer’s estimate in 1885, with 25 per cent added.

The following table of the world’s industrial consumption was compiled from the above returns, the figures for 1898 being used where no official information was received for 1899:

THE WORLD’S INDUSTRIAL CONSUMPTION OF GOLD AND SILVER IN 1899.

Countries.	Gold.		Silver.		
	Weight.	Value.	Weight.	Coining value.	Commercial value.
	<i>Kilograms.</i>		<i>Kilograms.</i>		
Austria-Hungary.....	4,302	\$2,859,100	58,237	\$2,420,300	\$1,123,400
Belgium.....	2,543	1,690,100	20,000	831,200	385,800
Brazil.....	750	498,400			
Egypt.....	1,077	715,800	5,034	209,200	97,100
England.....	22,824	15,168,800	216,650	9,004,000	4,179,200
France.....	21,600	14,355,400	235,000	9,766,600	4,533,200
Germany.....	10,743	7,139,800	150,000	6,234,000	2,893,500
Italy.....	5,000	3,323,000	21,000	872,800	405,100
Netherlands.....	590	392,100	9,473	393,700	182,700
Paraguay.....	3	2,000	100	4,200	1,900
Portugal.....	1,162	772,300	6,618	275,000	127,700
Russia.....	4,259	2,830,500	114,733	4,768,300	2,213,200
Sweden.....	505	335,600	5,230	217,300	100,900
Switzerland.....	6,230	4,140,400	55,000	2,285,800	1,061,000
United States.....	22,739	15,112,200	327,962	13,630,100	6,326,400
Other countries.....	5,000	3,323,000	50,000	2,078,000	964,500
Total.....	109,327	72,658,500	1,275,037	52,990,500	24,595,600

WORLD’S PRODUCTION OF GOLD AND SILVER IN 1899.

The world’s gold production in 1899 was 461,305 kilograms, or 14,831,039 ounces, fine, of the value of \$306,584,900.

The result is largely an estimate, since most of the foreign countries collect no statistics of the production of gold and silver, and the data must be obtained from their exports and coinage; in many cases the official figures are a year or two late, and the product for 1899 must be assumed to be equal to that of the last year for which official information is available, and further, the amount of local consumption in the industrial arts is largely a matter of conjecture.

These matters are more fully treated in Part II, under the heads of the several countries. A very close scrutiny of the results, where the figures are accepted with these qualifications, warrants the conclusion that the possible error from all sources may amount to a deficiency of not more than 3 per cent of the world’s gold product for 1899.

The results for 1899 show an increase of 30,090 kilograms, or 967,419 ounces, valued at \$19,998,400, or about 7 per cent over the product of 1898. The increase is not as large as that of the preceding year, owing chiefly to the effects of the war in South Africa.

Since 1887, when about \$106,000,000 were produced, each year has shown an increase over the preceding one. In 1892, over \$146,000,000 was produced, this being at that time the largest production in the history of the world. Previous to that date the largest production was between the years 1856 and 1860, when it averaged \$134,000,000.

The 1899 product is nearly nine times larger than the production at the time of the California discoveries, it is greater than the combined production of gold and silver (at coining value) in 1891, when the world's production of silver reached its high-water mark, and greater also than the combined production of both metals in each of the subsequent three years (up to and including 1894).

There is no reason to expect any cessation of this steady annual increase for some years to come. The Transvaal has not nearly reached its limit; Australia, particularly West Australia, is not yet half developed; Alaska and the Yukon have only fairly begun to produce, while the recent steady increase in Colorado and other Western States shows no sign of abating. The present output differs from that in the fifties, when the California placers yielded such enormous stores of gold, because those could be exhausted, more or less speedily, while the present yield comes from the working of low-grade ore, rendered profitable by improved modern methods of reduction, and is practically unlimited.

The following table shows, in round numbers, the increase and decrease for 1899 as compared with 1898:

GOLD.

Countries.	Increase in 1899.	Decrease in 1899.
United States	\$6,590,400	.....
Canada	7,485,600	.....
Africa .....	.....	\$6,901,400
Australasia	14,460,800	.....
Russia .....	.....	3,296,300
Austria-Hungary	84,400	.....
Germany	600	.....
Sweden .....	.....	13,000
Portugal .....	.....	5,700
Great Britain	52,200	.....
Bolivia	50,900	.....
Colombia .....	.....	349,200
Ecuador	8,400	.....
Brazil	565,800	.....
British Guiana .....	.....	8,200
Dutch Guiana	18,500	.....
French Guiana	44,300	.....
Central America	106,400	.....
China	181,700	.....
Korea	290,800	.....
British India	736,000	.....
British East Indies .....	.....	104,600
Total	30,676,800	10,678,400
Net increase	19,998,400	.....

Of the chief gold-producing countries the Transvaal and Russia only show a decrease, which in the case of the former is but an apparent decline, the mining results for the first nine months of the year being far in excess of those for the same portion of the preceding year.

The world's production of silver in 1899 was 5,202,309 kilograms, or 167,224,243 ounces, fine, of a United States coining value of \$216,209,100, and of a commercial value of \$100,321,100. For the reasons stated above, these figures are approximations only. The correctness of the statistics of silver production was questioned by Professor Lexis at the last session of the International Statistical Institute, held at Christiania in the fall of 1899. He thought that about one-sixth of the world's product of silver did not appear in the statistical returns. A critical analysis of the figures for 1899, made in this Bureau, leads to the conclusion that the deficiency is probably less than 12 per cent of the product of the world, not including China, whose product is an unknown quantity.

The figures for 1897 and 1898 have been corrected in accordance with the latest information received after the publication of last year's report. This somewhat modifies the comparison made there between the results of 1897 and 1898. The production of 1898 showed an increase, in round numbers, of 400,000 kilograms, or 12,800,000 ounces, of the coining value of \$16,500,000 and of the commercial value of \$6,000,000.

The year 1899 was marked by a backward step in the production of silver, the decrease in the world's product being 186,784 kilograms, or 6,003,621 ounces, of the coining value of \$7,762,400 and of the commercial value of \$1,883,500. The decrease in the commercial value did not follow the decrease of the coining value, owing to an improvement in the price of silver.

The following table shows the increase and decrease of the silver yield of 1899 as compared with that of 1898:

SILVER.

Countries.	Increase in 1899.	Decrease in 1899.
	<i>Fine ounces.</i>	<i>Fine ounces.</i>
United States	326,500	
Mexico.....		1,125,910
Canada		1,040,689
Australasia	2,195,558	
Russia		143,605
Austria-Hungary	80,959	
Germany.....	670,537	
Norway.....		6,419
Sweden	8,274	
Portugal.....	1,441	
Great Britain		24,765
Bolivia.....		5,188,736
Colombia		1,962,154
Central America	205,388	
Total.....	3,488,657	9,492,278
Net decrease		6,003,621

The following table shows, by calendar years, the production and value of gold and silver in the world since 1860:

PRODUCT OF GOLD AND SILVER IN THE WORLD SINCE 1860.

[The annual production of 1860 to 1872 is obtained from 5-year period estimates, compiled by Dr. Adolph Soetbeer. Since 1872 the estimates are those of the Bureau of the Mint.]

Calendar years.	Gold.		Silver.		
	Fine ounces.	Value.	Fine ounces.	Commercial value.	Coining value.
1860.....	6,486,262	\$134,083,000	29,095,428.	\$39,337,000	\$37,618,000
1861.....	5,949,582	122,989,000	35,401,972	46,191,000	45,772,000
1862.....	5,949,582	122,989,000	35,401,972	47,651,000	45,772,000
1863.....	5,949,582	122,989,000	35,401,972	47,616,000	45,772,000
1864.....	5,949,582	122,989,000	35,401,972	47,616,000	45,772,000
1865.....	5,949,582	122,989,000	35,401,972.	47,368,000	45,772,000
1866.....	6,270,086	129,614,000	43,051,583	57,646,000	55,663,000
1867.....	6,270,086	129,614,000	43,051,583	57,173,000	55,663,000
1868.....	6,270,086	129,614,000	43,051,583	57,086,000	55,663,000
1869.....	6,270,086	129,614,000	43,051,583	57,043,000	55,663,000
1870.....	6,270,086	129,614,000	43,051,583.	57,173,000	55,663,000
1871.....	5,591,014	115,577,000	63,317,014	83,958,000	81,864,000
1872.....	5,591,014	115,577,000	63,317,014	83,705,000	81,864,000
Total	78,766,630	1,628,252,000	547,997,231	729,563,000	708,521,000
1873.....	4,653,675	96,200,000	63,267,187	82,120,800	81,800,000
1874.....	4,390,031	90,750,000	55,300,781	70,674,400	71,500,000
1875.....	4,716,563	97,500,000	62,261,719.	77,578,100	80,500,000
1876.....	5,016,488	103,700,000	67,753,125	78,322,600	87,600,000
1877.....	5,512,196	113,947,200	62,679,916	75,278,600	81,040,700
1878.....	5,761,114	119,092,800	73,385,451	84,540,000	94,882,200
1879.....	5,262,174	108,778,800	74,383,495	83,532,700	96,172,600
1880.....	5,148,880	106,436,800	74,795,273.	85,640,600	96,705,000
1881.....	4,983,742	103,023,100	79,020,872	89,925,700	102,168,400
1882.....	4,934,086	101,996,600	86,472,091	98,232,300	111,802,300
1883.....	4,614,588	95,392,000	89,175,023	98,984,300	115,297,000
1884.....	4,921,169	101,729,600	81,567,801	90,785,000	105,461,400
1885.....	5,245,572	108,435,600	91,609,959.	97,518,800	118,445,200
1886.....	5,135,679	106,163,900	93,297,290	92,793,500	120,626,800
1887.....	5,116,861	105,774,900	96,123,586	94,031,000	124,281,000
1888.....	5,330,775	110,196,900	108,827,606	102,185,900	140,706,400
1889.....	5,973,790	123,489,200	120,213,611	112,414,100	155,427,700
1890.....	5,749,306	118,848,700	126,095,062.	131,937,000	163,032,000
1891.....	6,320,194	130,650,000	137,170,919	135,500,200	177,352,300
1892.....	7,094,266	146,651,500	153,151,762	133,404,400	198,014,400
1893.....	7,618,811	157,494,800	165,472,621	129,119,900	213,944,400
1894.....	8,764,362	181,175,600	164,610,394	104,493,000	212,829,600
1895.....	9,615,190	198,763,600	167,500,960.	109,545,600	216,566,900
1896.....	9,783,914	202,251,600	157,061,370	105,859,300	203,069,200
1897.....	11,420,068	236,073,700	160,421,082	96,252,700	207,413,000
1898.....	13,863,620	286,586,500	173,227,864	102,204,600	223,971,500
1899.....	14,831,039	306,584,900	167,224,243.	100,321,100	216,209,100
Total	181,778,153	3,757,688,300	2,952,071,063	2,663,196,200	3,816,819,100
Grand total.....	260,544,783	5,385,940,300	3,500,068,294	3,392,759,200	4,525,340,100

WORLD'S COINAGE, 1897, 1898, AND 1899.

In the Appendix will be found a table, revised from the latest information received, exhibiting the coinages of the various countries of the world during the calendar years 1897, 1898, and 1899. The following is a summary of the same:

COINAGE OF NATIONS.

Calendar years.	Gold.	Silver.
1897	\$437,722,992	\$167,790,006
1898	395,477,905	149,282,936
1899	466,110,614	166,226,964

While the above figures represent, as accurately as the Bureau has been able to ascertain, the total value of the gold and silver coinage of the world during the calendar years 1897, 1898, and 1899, they do not accurately represent the value of the coinage from new material alone, but include the value of the recoinage of foreign and domestic coins, and that derived from old material, plate, jewelry, etc., melted and used in coinage. Many foreign governments in their reports to the Bureau failed to separate the values of the coinage derived from these various sources.

The following table exhibits, by calendar years, the fine ounces and value of the gold and silver coinage of the world since 1873:

COINAGE OF GOLD AND SILVER OF THE MINTS OF THE WORLD FOR THE CALENDAR YEARS SINCE 1873.

Calendar years.	Gold.		Silver.	
	Fine ounces.	Value.	Fine ounces.	Coining value.
1873	12, 462, 890	\$257, 630, 802	101, 741, 421	\$131, 544, 464
1874	6, 568, 279	135, 778, 387	79, 610, 875	102, 931, 232
1875	9, 480, 892	195, 987, 428	92, 747, 118	119, 915, 467
1876	10, 309, 645	213, 119, 278	97, 899, 525	126, 577, 164
1877	9, 753, 196	201, 616, 466	88, 449, 796	114, 359, 332
1878	9, 113, 202	188, 386, 611	124, 671, 870	161, 191, 913
1879	4, 390, 167	90, 752, 811	81, 124, 555	104, 888, 313
1880	7, 242, 951	149, 725, 081	65, 442, 074	84, 611, 974
1881	7, 111, 864	147, 015, 275	83, 539, 051	108, 010, 086
1882	4, 822, 851	99, 697, 170	85, 685, 996	110, 785, 934
1883	5, 071, 882	104, 845, 114	84, 541, 904	109, 306, 705
1884	4, 810, 061	99, 432, 795	74, 120, 127	95, 832, 084
1885	4, 632, 273	95, 757, 582	98, 044, 475	126, 764, 574
1886	4, 578, 310	94, 642, 070	96, 566, 844	124, 854, 101
1887	6, 046, 510	124, 992, 465	126, 388, 502	163, 411, 397
1888	6, 522, 346	134, 828, 855	104, 354, 000	134, 922, 344
1889	8, 170, 611	168, 901, 519	107, 788, 256	139, 362, 595
1890	7, 219, 725	149, 244, 965	117, 789, 228	152, 293, 144
1891	5, 782, 463	119, 534, 122	106, 962, 049	138, 294, 367
1892	8, 343, 387	172, 473, 124	120, 282, 947	155, 517, 347
1893	11, 243, 342	232, 420, 517	106, 697, 783	137, 952, 690
1894	11, 025, 680	227, 921, 032	87, 472, 523	113, 095, 788
1895	11, 178, 855	231, 087, 438	98, 128, 832	126, 873, 642
1896	9, 476, 639	195, 899, 517	123, 394, 239	159, 540, 027
1897	21, 174, 850	437, 722, 992	129, 775, 082	167, 790, 006
1898	19, 131, 244	395, 477, 905	115, 461, 020	149, 282, 936
1899	22, 548, 101	466, 110, 614	128, 566, 167	166, 226, 964
Total	248, 212, 216	5, 131, 001, 935	2, 727, 246, 259	3, 526, 136, 590

REPORTS OF THE SPECIAL AGENTS OF THE BUREAU OF THE MINT
ON THE PRODUCTION OF THE PRECIOUS METALS IN 1899
IN THE SEVERAL STATES AND TERRITORIES.

I.

ALASKA.

By CHARLES G. YALE.

The methods of obtaining figures of "distribution" of the gold and the silver products generally adopted in the different mining States of the Union bring very poor results when dealing with the placer mining camps of the district of Alaska. The population of these camps is more or less nomadic, moving from place to place as strikes in new creeks are announced. The season of mail communication among the camps along the Yukon River and its tributaries, with their numerous smaller rivers and creeks, is very short, and when the spring "clean-ups" have been made or the summer diggings begin to freeze, the men come "outside" for the winter or go to larger camps. For these reasons it is almost impossible to obtain the desired statistical information as to output of gold by correspondence with the individual miners. In the case of the quartz mines it is different. They are almost entirely confined to southeastern Alaska, communication with which may be had throughout the year, and such camps are of course fixtures, with a permanent population. It is therefore possible to get returns by calendar year from these quartz operations, and their product may be segregated from the total output of Alaska, so that the actual yield of all the placer operations may be thus closely approximated, without, however, distributing or apportioning this among the different camps according to their separate product.

The method adopted has therefore been to obtain from United States mints and assay offices, and private refineries and smelters, their respective receipts of Alaska gold, the sum of these representing the entire output of the district of Alaska for the calendar year. The returns from the quartz mining companies are readily procured from the secretaries and superintendents, and the sum of these returns represents the output from quartz mines in the district.

The quartz of Alaska is generally of low grade, but occurs in very large ledges, so it is possible with large mills to make a very good profit. For these reasons only companies with plenty of capital take hold of these properties, and there are no small individual operations in quartz. The returns from the quartz mines, when deducted from the total returns from mints, assay offices, refineries, etc., leave the balance as derived from placers.

The following table shows the gold and silver product of Alaska for the calendar year 1899:

STATEMENT OF BULLION OF ALASKA PRODUCTION RECEIVED AT UNITED STATES MINTS AND ASSAY OFFICES AND PRIVATE REFINERIES AND SMELTERS DURING CALENDAR YEAR 1899.

Metals.	Standard ounces.	Coining value.
Gold	308,108.147	\$5,602,012.04
Silver	197,092.24	229,343.69

It is to be borne in mind that these figures refer in no manner to "Klondike" output, that region being in Northwest Territory, and subject to a separate computation, as shown hereafter.

As the Alaskan product in 1898 was \$2,517,121 gold and \$114,390 silver, the figures in the above show that the increase in yield of 1899 over the previous year was \$3,199,844, the total gold and silver for 1899 being \$5,831,355. The district of Alaska, therefore, more than doubled its bullion product in 1899. Of this increase of over three million dollars a careful estimate shows that \$2,400,000 came from the new placer camp at Cape Nome last season, the first year in its history, and the rest of the increase from the quartz mines of southeastern Alaska. The placer camps along the Yukon River gave evidence of only slightly increased yield for the year.

In southeastern Alaska, including Douglas and Unga islands, the quartz mines are now running 1,050 stamps in their mills, and employing 1,308 men at average wages of \$2.50 per day and board. The combined product of these quartz mines for 1899 was \$2,704,176, out of a total yield for Alaska of \$5,831,355. This makes the yield of the placer mines of the district of Alaska \$3,127,179, of which \$2,400,000 came from the beach and "tundra"¹ mines of Cape Nome, and the balance of \$727,179 from the placer camps along the Yukon River and tributaries, placers near Golovin Bay, beach mines at Lituya Bay, hydraulic mines near Juneau, and the claims in Porcupine district, southeastern Alaska.

Throughout Alaska there are very many more prospectors than actual miners, and large numbers of people who are neither prospectors nor miners have been flocking in that direction in the past two years. While numbers of these men congregate in the better known camps, some thousands of them are prospecting on the larger tributaries of the Yukon and their branches, and along the coast of Norton Sound as far west and north as Bering Straits. There have been reports of rich strikes during the winter on some tributaries of the Koyukuk, but thus far (April) these lack verification.

The point in Alaska, however, which now attracts most attention, not only of residents of the northern regions, but that of the miners of the United States, is Cape Nome. This is on Norton Sound, Bering Sea, and about 160 miles from St. Michael. Diggings were discovered there in the fall of 1898, and work done in the summer of 1899 proved them to be both rich and extensive. In fact, the impression prevails that this camp will be a more productive one than the famous Klondike, and is all in American territory, on the seacoast, easy of access in the summer months. In the winter the ice in Bering Sea prevents communication. Some of the claims on favored creeks have already shown equal possibilities with the more famous claims of the Klondike.

This camp differs from others thus far discovered in Alaska, in that it has both "tundra" and beach claims.

The claims along the ocean beach extend for a distance of about 40 miles, growing gradually less rich in gold toward the western extremity. The "tundra" claims are shallow placers, being in many places not more than six feet to bedrock.

¹ "Tundra" is the term for the moss-covered land, more or less marshy in summer, which extends over so large a portion of northwestern Alaska. Under the moss in the Nome region is the gold-bearing gravel.

The ocean beach diggings claimed the most attention in the summer of 1899, because they could be so readily worked by individual miners with the simple old-fashioned rockers, common in most placer-mining countries. Large numbers of the men worked along the beach and realized good rewards for their labor.

Ocean beach sands have been worked at Lituya Bay, Yakutat Bay, and other places in Alaska for some years, but nowhere on the Pacific coast have such rich sands been found as those on the coast at Cape Nome. The gold on that beach is much coarser and more abundant than upon any beaches yet found in Alaska, California, or elsewhere. The sands are called "ruby" sands because they are largely made up of minute rubies; they also carry topazes and garnets—very small—almost microscopic in size.

It is in this concentrated "ruby" sand that the gold is found. As in other parts of Alaska, this "ruby" sand does not carry much gold unless there is also present the ordinary "black" or magnetic iron sand, the same as on the California beaches. The gold on the Nome beach differs from that of all other beaches in California and Alaska in that it is coarse and heavy, and good-sized nuggets are not rare.

It is probable that this Nome beach gold was transported to its present position by glacial action. It is more or less angular and does not seem to have been so much water worn as in ordinary placers.

The same may be said of the "tundra" gold in the same locality, and many pieces have been found with quartz still clinging to them. The edge of the ocean seems to have been the terminal of the glaciers, which here gave up their burdens of gravel, gold, etc. On the Nome "tundra" the gold is not confined to the beds of waterways, but is found all over the district, being naturally most concentrated, however, in the creek beds where moving water gathered it.

The gold deposits at Cape Nome extend some miles inland and up into the hills. Back of these and across the range of mountains are the placers of Golovin Bay district, where there are many mines on the different creeks emptying into the Fish River. On account of the presence of gold on the beach at Nome, the deposits are supposed to extend indefinitely out under the ocean beyond the shore line, and, in fact, gold has been taken from the ocean bed some hundreds of yards away from the surf line.

For this reason arrangements have been made by a number of companies to try ocean dredging for gold during the season of 1900 outside the surf line at Nome. The results of this class of work on the open sea are doubtful, to say the least, and the one dredger tried there in 1899 was not successful, work having been discontinued after a few days. The swell of the ocean in that locality is such that dredging operations will be difficult to carry on with any degree of regularity or safety, even if it is proven that the accessible ocean bed sands are as rich as those on the beach, and this is not known as yet.

The richer portion of the Nome beach sand will doubtless be worked out in about two seasons where it can profitably be worked by individual exertion. The remaining sands will then doubtless be handled on a larger scale. A number of tons of the sand brought to San Francisco in 1899 yielded at the smelter \$40.60 per ton, which is far beyond what the beach sands discovered elsewhere have paid.

The claims on the "tundra," back of the beaches, are more permanent in character and also richer, though the gravel is not at all deep.

Those claims which lie on the flat lands below the foot of the hills will be somewhat difficult to work by ordinary means, as there is no fall for sluicing and no place for dump. Where the streams from the hills run through these flat claims the adjacent properties can readily be worked, but those away from the water courses may not be worked except in a smaller way.

As in other districts the richness of the creeks varies greatly, but all show more or less gold. When the conditions of price of labor and provisions change, as they doubtless will, many of these creeks which can not now be worked will be handled profitably. There is at present much confusion on the titles, owing to aliens having located claims and to the fact that numbers have been taken up by power of attorney, to which miners on the ground strongly object. Many of these difficulties will naturally be judicially settled during the summer of 1900, as United States courts will be in session there for the first time and the requisite machinery for settling title will be afforded the mining community.

Up to this time the ordinary rocker has been mainly used for working the beach sands, as it has been difficult to get sufficient water or "fall" for sluicing. The miners will doubtless adopt the ordinary California or Oregon Tom, which has been found the most successful machine for beach mining along the California coast, after experiments with almost numberless appliances. These machines are unpatented and require no power mechanism, running water performing all the work of separating the gold. They are capable of handling to a profit beach sands which contain a dollar or less per ton in gold, where sufficient water is available. Of course, a number of patented appliances for saving gold, many of them new and experimental in character, will be tried at Nome during the season of 1900.

Very little news of a definite character has been received from Cape Nome since the winter of 1899 set in, though reports of new strikes farther round toward Cape York and that vicinity have been sent out. At this time (April, 1900) it is too soon for a verification of these reports. Numbers of steamers and sailing vessels have started from San Francisco and Seattle for Cape Nome, but it will be the end of June before any of them return with news of the doings in that part of Alaska. Some men have worked on the beach in winter by putting up tents, under which they have dug and then thawed and washed the material in a small way. But no satisfactory work may be done except in the summer months. Arrangements are being made by several companies to bring water into some of the creeks, and these works will be constructed during the summer of 1900. Thus far the miners worked their claims at great disadvantage, and it is surprising that so large a yield could have resulted the first season under the prevailing conditions. This year there will be abundant timber, fuel, supplies, etc., and a far greater amount of work made possible. The many thousands of men who are on the way or going should give the region along that coast a pretty thorough prospecting during this season, and doubtless many new discoveries will be made.

At the older camps of Minook, Circle City, etc., up the Yukon River, work has been continued as usual during the winter, but large numbers of men have left these places for the more attractive diggings at Cape Nome. During the whole winter parties of prospectors and miners have been moving down the river over the ice toward the coast

diggings. Some of them have branched aside toward the reported discoveries on the Koyukuk River, of which nothing definite is yet known on the "outside."

There have been several reports of discoveries of coal and copper in Alaska, but their extent and value are yet to be proven.

As a matter of interest the following table, showing the production of gold and silver in the "Klondike" region for 1899, has been compiled:

STATEMENT OF BULLION OF NORTHWEST TERRITORY PRODUCTION RECEIVED AT UNITED STATES MINTS, ASSAY OFFICES, AND PRIVATE REFINERIES AND SMELTERS DURING THE CALENDAR YEAR 1899.

Metals.	Standard ounces.	Coining value.
Gold.....	859,281.228	\$15,986,627.50
Silver.....	229,788.95	267,390.77

This table shows a marked advance in output of the Klondike field, since the increase over the previous year is \$5,028,198, the total for 1899 being \$16,254,018.27.

ALASKA AND NORTHWEST TERRITORY.

STATEMENT OF BULLION OF ALASKA PRODUCTION RECEIVED AT UNITED STATES MINTS, ASSAY OFFICES, AND PRIVATE REFINERIES AND SMELTERS DURING CALENDAR YEAR 1899.

Depository.	Gold.	Silver.
United States assay office—	<i>Standard ozs.</i>	<i>Standard ozs.</i>
New York.....	371.327	88.48
Helena.....	97.815	9.74
Seattle.....	63,299.817	10,517.13
United States mint—		
Denver.....	1,002.260	270.78
New Orleans.....	5.545	.68
San Francisco.....	23,789.151	3,312.71
Refineries and smelters.....	212,542.232	182,892.72
Total.....	301,108.147	197,092.24
Coining value.....	\$5,602,012.04	\$229,343.69
Commercial value at 53 cents.....		104,458.90

STATEMENT OF BULLION OF NORTHWEST TERRITORY PRODUCTION RECEIVED AT UNITED STATES MINTS, ASSAY OFFICES, AND PRIVATE REFINERIES AND SMELTERS DURING CALENDAR YEAR 1899.

Depository.	Gold.	Silver.
United States assay office—	<i>Standard ozs.</i>	<i>Standard ozs.</i>
Boise.....	31.003	8.25
New York.....	4,436.316	1,239.28
St. Louis.....	11.163	3.18
Helena.....	3,599.154	961.81
Seattle.....	576,673.550	147,313.73
United States mint—		
Carson.....	15.589	3.11
Philadelphia.....	3,487.616	884.54
San Francisco.....	132,137.949	34,930.61
Refineries.....	138,888.888	44,444.44
Total.....	859,281.228	229,788.95
Coining value.....	\$15,986,627.50	\$267,390.77
Commercial value at 53 cents.....		121,788.15

GOLD IN ALASKA.

REPORT ON THE CONDITIONS AND PROSPECTS AT NOME.

NOME CITY, *September 3, 1900.*

HON. GEORGE E. ROBERTS,
Director of the Mint, Washington, D. C.

SIR: I have deferred reporting to you since my arrival in Nome, as the conditions here were so uncertain that nothing reliable could be said either as to the future production or that up to the time of my arrival.

At this time it is definitely known that the beach can not be counted upon, even as a small producer, in the future. When we arrived this summer, the beach had already been worked over for the second time, and the many sluicing plants which were erected had to content themselves with the tailings and an occasional rich spot of ground which had been overlooked by previous miners. This condition, combined with the fact that from 1,000 to 1,500 hundred rockers continued at work, made it impossible for these plants to more than make wages, and in many cases they were complete failures.

In one case I recall a sluicing plant was taking out about \$300 per day at an expense of possibly \$50. When this leaked out, 77 rocker men, by actual count, settled around this plant, and as the owner of the plant had no claim to the ground that was recognized by the rocker men it became impossible for him to hold an area sufficient to continue operations for a single week. In spite of all these difficulties, I estimate that the beach has produced during the present season between \$250,000 and \$300,000. The exact amount is difficult to arrive at, since the beach dust comes into the banks mixed with the dust from the creeks, as well as from foreign sources.

At the time of our arrival I estimate that fully one-half of all the dust in circulation in Nome was produced in Dawson. This can be easily shown by an examination of the fineness of the bars shipped from this locality during July and August. The average fineness of Dawson gold is .780, while the average fineness of Nome gold is .890. The bars shipped to the assay office at Seattle during the period referred to above were from .835 to .845 fine, which would represent equal parts of Dawson and Nome gold. This is the only method that I know of of arriving at these figures.

Leaving the beach, we should first consider Anvil Creek, not only as the greatest producer up to the present time, but as the probably greatest producer of the near future—at least for the next year. There are 18 claims on this creek which have either produced or give promise of producing. Starting with Discovery, we have from 1 to 6, inclusive, below and from 1 to 11, inclusive, above. These claims have been worked more or less with the exception of 5 and 6 below, which have only been prospected. The principal producers are Discovery; 1, below; 1, 2, 3, 4, 5, 7, 8, and 9, above. From these claims I estimate there has been taken this year about \$750,000, which may include gold from the benches along Anvil. I estimate that if the legal complications were adjusted these claims might all be worked out by the end of next season, but certainly by the end of the second season.

On Dexter Creek, which is practically a dry creek, we have a number of very rich claims. These have not produced largely this year, owing to drought and legal entanglements, but with the introduction of the pumping plant which Mr. Charles D. Lane, of San Francisco, is now constructing, they should all produce well. Snow Gulch, another rich creek, has produced only about \$5,000 this season, while last year, I am told by the same authority, it produced \$300,000. This falling off was due entirely to a lack of water. Of the numerous creeks other than those above named, with the exception of Oregon, Twin Mountain, and Mountain creeks, and Dry Creek, comparatively nothing is heard. Many men are prospecting throughout the entire country, and we can only tell what has been produced when they come in, as they are very secretive in all matters concerning their productions.

This is due, no doubt, to the present legal complications, which are rapidly involving all claims of value in this section. Of the producing claims, and also those which produced last year, nearly all are now in the hands of receivers, appointed by the court to conduct the mining operations under his direction. This naturally has caused a great deal of comment and criticism, either just or unjust. But be that as it may, the result has been that investments in mines in this locality are at a standstill, no one being willing to take the hazard of a lawsuit in addition to that of a mining investment.

Of the new discoveries since last season Topkuk, located on the beach, 60 miles east of here, easily takes the lead. From a space not over 500 feet in length along the beach and back to the tundra there was taken out this spring between \$500,000 and \$600,000, all with rockers. At present much of this ground is being reworked

with sluices, and much gold is still coming from the locality. In the immediate neighborhood are several good claims lying along Daniel's Creek, and pumping plants are now being erected to work them, so that next year you may look for a considerable production from that quarter.

The latest strike, and one which is at present attracting most attention, is on the Bluestone River, in the Port Clarence mining district, something less than 100 miles from Nome. One of the tributaries of this river—Gold Run—is said to exceed in richness anything known heretofore, it being no uncommon thing to get from \$10 to \$20 in a single pan. The creek is entirely taken up, but little work can be done this season, though it may yet produce a couple of hundred thousand dollars. In my complete report I will discuss it more fully.

A source of gold which is attracting much attention at the present time is the ancient river beds along the head of Dexter and Anvil creeks. These deposits are locally known as bench claims, since they form benches above the present bed of the creeks. Some of these deposits are fabulously rich, nothing richer having been found in the Klondike, I am told, than some of the claims along Nikkala Gulch. The extent of these deposits, however, has not yet been proven, and another season will be necessary to demonstrate their value.

I incline to the opinion that these ancient channels are the source of the gold found in all the creeks in this district, as well as the gold taken from the beach, and if I am right in this opinion, they should be very extensive and add many millions to the world's production. The general trend of these channels is east and west, while in a general way the present flow of the streams is north and south, thus cutting almost at right angles these ancient beds and in many places eroding them to bed rock for several miles. Some weight is given to this purely theoretical opinion by the fact that no gold has been found in paying quantities in any rock in place, so far as I am aware, in this or any other adjoining mining district, which would tend to show that the source of this gold was not the present quartz leads, but that it must have come from quartz deposits, which were eroded during a prior geological period, marked by the ancient river channels.

The placer deposits which exist here are very similar to those existing in the Klondike. It will be recalled that gold was first struck along the creeks, and that later it was found on the hillsides and traced to Gold Hill, French Hill, and Chechaka Hill, these hills representing positions of ancient channels which had not been removed to the creeks below. This being the case, I see no reason to doubt that during the coming winter, when prospecting can be done with the aid of thawing machines, these channels will be located, and next season will see a very largely increased production.

In conclusion, I would say that, in my opinion, the future of this district remains to be proven, with the chances largely in favor of its becoming in the next two years a very great producer, and that this production will be due to the bench claims rather than the creek claims, as is in a large measure the case in the Klondike.

My estimate of the production up to this time is \$1,500,000, with the chance of increasing this production before the end of the season to \$2,000,000.

On my return to Washington I will make you a complete report on the methods of mining, illustrated by pictures taken here, and I also hope to give you a very accurate estimate of the gold produced throughout this entire peninsula.

Very respectfully,

CABELL WHITEHEAD.

GOLD MINING IN ALASKA.

[Consular Reports, November 3, 1899.]

Under date of September 14, 1899, Consul McCook, of Dawson City, transmits the following information relative to conditions in the gold fields of Alaska:

There is great activity in the Forty-Mile mining district, Alaska. The richness of Jack Wade Creek and other creeks in that section has induced hundreds of men to go there during the past month.

Charlie River, about 90 miles below Eagle City, developed good prospects last winter. Charlie River is not to be confounded with Charlie Creek. The first is about the size of the Klondike here, and boats can be poled up for 100 miles. It is safe to say some 100 men will prospect there the coming winter.

At Eagle City there is not an idle man. This town should make rapid progress when a good wagon road is built to connect with the Forty-Mile mining district. American Creek, near by, and its tributaries have been found to contain good paying ground.

The rush to Cape Nome continues from mining camps along the Yukon. Eagle City, a thriving camp of 1,500, has lost 500. At Circle City only about 75 remain out of 300, and Rampart City, which once boasted of a population of 1,600, can now only show 200. Many Americans now in Dawson are only waiting to follow the ice down the coming spring. Cape Nome has now a population numbering thousands, and supports several general merchandise and furnishing stores (clothing, furs, etc.), many saloons, dance halls, etc. As to the richness of the country there can be no doubt, especially of the deposit along the shore. The so-called "ruby sand" has been traced to Port Clarence, 130 miles west of Cape Nome. The creeks adjacent to Cape Nome, back from Golovin Bay, are also improving in output under careful prospecting. It is calculated that upward of 20,000 people will be in the vicinity of Cape Nome the coming year.

"Ruby sand," a sample of which—from Cape Nome—I have lately seen, is not the ordinary beach sand, but is composed of very fine gravel and minute specimens of the common garnet or false ruby, from which the sand gets its name. Interspersed throughout the sample are gold particles, some of medium fineness, some as coarse as ordinary rifle powder. Amalgamating machines will be necessary to save all of this gold, as it is calculated that fully 40 per cent is lost in working with the common rocker. It would pay to send such machines to Cape Nome, as, with over 100 miles of beach diggings of this description, many will be needed.

The gold fields in the Territory of Alaska at Forty-Mile, Eagle City, and Seventy-Mile districts are becoming more promising, and bid fair to rival any territory yet discovered for placer gold mining. The geological formation in the above-named districts is practically the same as that adjacent to Dawson.

Sections of the Forty-Mile district have been difficult of access; but since the location of a mining camp at Eagle City prospecting parties have been sent out to examine the tributaries of Forty-Mile River, and good paying ground has been discovered during the past winter. Slade Creek, a tributary in the Eagle City district, has recently been found to contain much gold, and no doubt many other creeks will be found equally as rich. In the Forty-Mile district, American Creek, Chicken Creek, and Stonehouse Creek contain rich gold deposits, but the best in this district is Jack Wade Creek, which, from all indications, will equal any yet found, even in the Yukon district of Canada.

The gold belt of the Koyuk mining district, in the vicinity of Union City and Peavy trading post, Alaska, is also found to be as rich as Forty-Mile district, and more adapted to hydraulic mining. Circle City was almost deserted at the time of these discoveries, the miners stampeding across the country to the Koyuk, a long distance. From Rampart City the trip was only 200 miles and the trails were in a good condition. The ground where gold has been found in the Koyuk district is reported not so frozen as in the Klondike, and is therefore easier to work.

It is surmised that Alaska will exceed the Canadian Yukon in gold output in a few years, if properly developed. It covers more gold-bearing territory and the gold so far discovered is evenly distributed, not being in pockets, as is the case on many creeks in the Klondike district, where one claim may be rich and the adjoining one worthless.

The miners in United States territory have different regulations for each district. For instance, on American Creek the miner is allowed a 1,320-foot claim, as per United States statutes; while on Wolf Creek, adjacent, the miner is allowed only a 500-foot claim; on Jack Wade Creek, 1,000 feet is the length allowed.

Staking by illegal powers of attorney is practiced. The recorder, in order to get his fee of \$2.50, records for anyone making a statement. On Jack Wade Creek many claims were staked by parties who were sent from Dawson with illegal powers of attorney. The miners held a meeting and declared that the staking by powers of attorney not properly authenticated before a notary public or recognized official was illegal. They afterwards declared the size of claims to be 1,320 feet, instead of 1,000 feet, as first determined. At still another meeting it was put on record that the powers of attorney previously declared illegal were thereafter to be considered legal.

It would be well if all the districts in Alaska could be governed by a uniform law, as local regulations often change the size of claims, etc. These conditions permit a miner to locate and record a claim on all the creeks, which would appear to operate against the welfare of the country. As it is now, if the owner of a claim is called away to visit his home in the United States, his claim may be divided during his absence by a miners' meeting.

With a United States land office at Circle City and one at Eagle City to cover the territory from Fort Yukon to the Canadian frontier, and another in the Koyuk district, conditions would be improved.

A sanitary inspector and a health officer have been appointed, and Dawson City is to be drained. There has been an overstock of fresh meat this winter—beef killed

in the fall and kept frozen. Moose meat has been brought in in large quantities by the Indians, which has helped to keep the price of beef down. This month caribou meat has been coming in, and a few mountain sheep. Otherwise provisions have remained at the high price prevailing all winter. Felt shoes are the recognized foot wear for this country and Alaska, at least from October to April. They are warmer and far superior to the old-fashioned Indian moccasin. All that were brought in last year were readily sold at \$10 per pair. These shoes should not cost to manufacture more than \$1.50 to \$2 per pair.

The mail service leaving Dawson twice a month has been excellent. The average time to Skagway is fifteen days; the trip was made once in ten. The mail service coming into Dawson has been wretched; on the 1st of March the mail of September, 1898, was received. During the month there has been such an accumulation of mail that the post-office has been alternately closed for two days to sort the mail, then opened for two days for distribution. A great disappointment has been the utter failure to deliver second-class matter. New York and Philadelphia papers came in for the first time about a month ago and found a ready sale at \$1.50 a copy.

The quickest route for persons coming into Alaskan territory for prospecting at Forty-Mile, Eagle City, or Seventy-Mile is by the pass, then by boat from Lake Bennet through Dawson. The bulk of freight for Dawson will, of course, come up the Yukon. The upper river from Dawson to head of navigation will be better supplied with boats this year than last, and it is to be hoped freight rates will be reduced. On the lower river, from St. Michaels, to Dawson City, the Alaska Exploration Company will have six river steamers and five barges; the Empire Line, four river steamers, one steam tug, and half a dozen barges; the Alaska Commercial Company, eight river steamers, two others chartered, and eight barges; the National Trading and Transportation Company, six river steamers; the Columbia Navigation Company, two river steamers; the Seattle-Yukon Transportation Company, three river steamers and three barges—all of which have accommodations for both freight and passengers. Some of the new steamers are fitted up as luxuriously as any river steamers in the United States. There are some fourteen steamers frozen up in the Yukon, and it is feared that when the ice breaks up, it will carry the boats with it. Some of the companies will run small steamers with supplies up the Koyuk River, as many people will remain in that section another winter.

The thawing machine has proved a great labor-saving device, and is much more economical than the old method, burning far less wood. The thawing machines so far consist of a boiler of, say, 10-horsepower, a small engine, and piping. There will be a demand for all brought in.

Claims are cheap on the market to-day, owing to the scarcity of money. A good many prefer loaning their money at 10 per cent a month interest on good claims to buying the claims.

One is struck on visiting the miners' cabins for the first time by the apparent lack of consideration for comfort. One finds a 12 by 14 or 14 by 16 cabin, with two bunks at the end facing the door, built to accommodate two or three persons for sleeping, though four, five, and six are often taken care of over night. The cooking stove is in a corner near the door. There is no ventilator except a small hole cut in the roof, as the door is usually closed. I have seen outside of a cabin similar to the one just described, hundreds of empty champagne bottles costing \$20 a pint. The money might have been spent in providing more habitable quarters.

J. C. McCook, *Consul*.

DAWSON CITY, *March 31, 1899.*

Under date of April 7, Consul McCook adds:

The outlook of the placer gold fields of the Klondike has not been better since gold was first discovered in the Yukon territory. Already this winter several new strikes have been made on creeks that were supposed to be barren. Last winter, the only creeks worked were Eldorado, Bonanza, and Hunker, and such a thing as looking for gold on the hillsides or benches was never attempted until last summer, after the snow had left the hillsides and mountain tops. The creek claims being all located, miners began to locate and prospect the hillsides and benches, with phenomenal success, many proving even richer than the creek claims. The most noted of these benches are those of Skookum Hill, adjoining Skookum Gulch; Gold Hill, opposite the mouth of Eldorado Creek; and French Hill, on the left bank of French Gulch; while, judging from the latest developments, the benches on Dominion, Hunker, and Quartz will prove equally as rich. Recently, strikes have been made on the benches of Last Chance, a tributary of Hunker Creek.

The creek claims that have come into prominence this season are those of Sulphur, Dominion, and Gold Run, all tributaries of Indian River. The first-named creek promises to rival Eldorado. The formation of the bed rock is the same as Dominion Creek, but is nearer the surface. The pay streak on Sulphur has been found to be 125 feet in width at different points on the creek. Dominion Creek property is booming, pay having been struck on the benches on both sides. Gold Run Creek is parallel with Dominion and Sulphur, and has a formation similar to the latter. Claims on this creek were sold last summer for 1 and 2 ounces, or \$32, while now they range in value from \$20,000 to \$50,000.

Other developments have occurred in the Stewart River district, the latest being Thistle, Scroggie, Tulare, and Ballarat creeks. A \$90 nugget was taken out of Discovery claim this month.

The principal drawback is the crude way of mining the frozen ground, as it is necessary to build fires to thaw it out and then wait till summer before it can be sluiced. This requires time. The price of labor in this country is on an average \$1 per hour and the cost of living is exorbitant, every necessity of life costing at least five times as much as in the outside world. In addition to all this is the 10 per cent royalty, which must be paid to the Government on the gross output. A claim in the Klondike must therefore be very rich to yield a profit. However, with proper machinery, this country will probably prove to have the richest placer fields ever known. Nor will the placer mines be the only source of revenue. There are indications of fine leads of quartz, as well as extensive veins of coal, which only need capital to develop.

On the Alaskan coast, between Cape Nome and Golovin Sound, strikes have recently been made which prove that the gold belt is not confined to the Klondike district or to the neighboring section of Alaska. A conservative estimate of the gold output from the Yukon territory this year is \$20,000,000. Next year I would not be surprised to find the output double that amount.

THE CAPE NOME GOLD FIELDS.

[Consular Report No. 234, March, 1900, pp. 379-381.]

The indications are that there will be a great rush to Cape Nome next spring, something like that to the Klondike in the spring of 1898. It is evident that numbers will go there from Victoria and this province in preference to either Atlin or the Northwest Territory. The transportation companies here and on the sound are all actively engaged in preparing steamers for the long trip. The distance from Victoria to Cape Nome is 2,500 miles, entirely by water. But, notwithstanding that fact, the transportation companies have already booked all the passengers that can be carried on the first trips on every vessel that can be secured. At a recent meeting of representatives of the companies it was computed that 65,000 persons desired to go to Cape Nome as soon as possible.

The reports that had been circulating last season in regard to the gold discoveries at Cape Nome were quite generally disputed here, the opinion being that the Atlin and Klondike countries were more promising and also easier of access. But the last two steamers from the north effectually dispelled all uncertainties, the passengers bringing with them indisputable evidence that all along the beach in the vicinity of Cape Nome gold in paying quantities can be had for the digging.

A number of these men have called at the consulate, exhibiting specimens of the gold, saying they dug it on the beach, near the water's edge; that men with only hand shovels and the simplest and rudest of pans cleared from \$50 to \$100 and even \$300 per day, while sometimes a clean up of from \$1,000 to \$1,500 has been reported. Nuggets worth from \$300 to \$400 were found near Anvil Creek, and it is believed \$300,000 to \$400,000 were taken out of Snow Gulch last summer; one man, it is said, took out \$190,000, while another claims still more. Every one of the men who came down expressed his resolve to return in the spring—some even engaging return passage on the steamers on which they came down. According to their statements, the gold does not extend to a great depth, 5 or 6 feet being as low as any have yet found "paying dirt."

Complaint was made by some of the returning miners that claims—20 acres each—which stretched for miles around and virtually embraced the whole shore from Cape Nome to Cape York, some 40 miles distant, had been staked. This, however, has been much changed by the decision of Commissioner Hermann, which is understood to mean that no land below ordinary high tide can be disposed of to individuals or corporations, but is open to the public to operate on; that the right to dig in these tide lands is as free as the right to fish in the adjacent waters; and that anybody

may wash gold out of the sand between high and low water, while no authority can give any person an exclusive right to do so; so that the land can not be obtained by corporations or syndicates. Some apprehension is felt that there may be a clashing of interests on that point, and it is generally desired that the Government establish regulations and have sufficient police to enforce them. Anxiety is expressed here regarding the establishment of a port of entry at Cape Nome. Captains all agree that there is practically no anchorage or harbor at the cape itself, but that at Port Clarence, distant only a few miles, there is a harbor, safe and commodious.

There are now between 5,000 and 6,000 people at Nome City, Anvil City, Cape York, Port Clarence, and vicinity. The buildings are, of course, of the most temporary character. A large number are on the beach below high-water mark, which does not tend to promote health, although the extreme cold of six months of the year precludes epidemics. Two newspapers are printed there, from which I take the following market quotations, current last fall:

Articles.	Price.	Articles.	Price.
Beef.....per pound..	\$0.75 to \$1.00	Potatoes.....per ewt..	\$10.00 to \$15.00
Wood.....per cord..	35.00 to 50.00	Onions.....do....	10.00 to 15.00
Flour.....per cwt..	10.00	Tomatoes.....per can..	3.00
Butter.....per pound..	1.00	Coal.....per ton..	75.00
Canned milk.....per can..	.50	Shingles.....per bunch..	7.50
Canned meats and fruits, about.	.75	Lumber.....per M feet..	250.00
Maple sirup.....per gallon..	4.00		

RULING RESTAURANT PRICES.

Articles.	Price.	Articles.	Price.
Steaks	\$1.50 to \$3.00	Clam chowder.....	\$0.75
Reindeer steak.....	2.00	Sardines.....per box..	1.00
Pork chops.....	1.50	Chicken tamales	.75
Mutton chops.....	1.50	Pork and beans.....	.75
Boiled mackerel.....	1.50	Cheese, with any order.....	.25
Coffee and doughnuts.....	.50	Ham and eggs.....	2.00
Hot cakes and maple sirup	.75	Three eggs	2.00
Corned-beef hash	1.00	Fruit and jam, all kinds..each..	.50
Pickled pigs' feet	1.00	Coffee, tea, or chocolate.....	.25
Mush and milk	.50	Pies.....each..	.50
Oyster stew, lobsters, etc	1.50	One loaf of bread.....	.25
Ham or salmon	1.00	Welsh rarebit.....	1.00
Hamburger steak.....	1.50	Coffee, with bread and butter ..	1.00

An ordinary two-story dwelling of eight rooms rents frequently for \$200 a month. Freight taken from the beach, where it is landed from steamers in barges, costs from 35 to 40 cents per cwt. For the delivery of heavy freight by horse team and wagon, \$10 an hour is charged.

The ruling price for a shave is \$1 and for a hair cut \$1.50. A bath costs \$2. Fifty cents is charged for laundering a flannel shirt, 75 cents for washing a colored linen shirt, and \$1 for the rehabilitation of the rare and luxurious garment known as the white shirt. Cigars and drinks cost 50 cents each. Longshoremen have been paid \$2 an hour for their labor. Carpenters receive \$1.50 an hour.

The prevailing fare to Cape Nome just now from Seattle or Victoria is \$100 for first-class and \$80 for second-class passage; freight, \$40 per ton. The earliest date at which any of the steamers are advertised to leave for Nome is May 1, 1900.

ABRAHAM E. SMITH, *Consul.*

VICTORIA, *December 21, 1899.*

THE YUKON AND NOME GOLD REGIONS.

BY SAM. C. DUNHAM.

THE YUKON AND ITS TRIBUTARIES.

The expenses, difficulties, and hardships of the summer journey from the coast to the Klondike are things of the past. The White Pass and Yukon Railroad was completed early in July, 1899, from Skagway to the head of Lake Bennett, a distance of about 40 miles. From Bennett City to Dawson the journey is now made in four days

in commodious and comfortable steamers, at a cost of less than \$100, including berth and meals. The up trip from Dawson to Bennett City occupies from six to ten days, according to stage of water. As a consequence of the great improvements in transportation on the upper Yukon and the lakes, the St. Michael route is now but little used for passenger traffic to and from the States. During the summer of 1899 about 8,000 people left Dawson, half of whom returned to the coast by the upper river route. Of the other half, about 2,500 went to Nome, and the remainder entered the Forty-mile district. Not to exceed 1,000 people arrived in Dawson from the outside world during the season, and not more than 50 of these went in by the St. Michael route. The news of the gold strike at Nome received no credence at Dawson until about September 1, and it was then too late, because of a lack of transportation facilities, for a general movement to the new gold fields.

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The greatest source of surprise to one returning to Dawson after a year's absence is the remarkable growth of the town. There are no traces of the two or three disastrous fires which occurred during the winter. Hundreds of fine buildings have been erected on every hand, and the hills back of the town are covered with substantial log and frame dwellings. The business portion of the town, which extends for a mile or more along the river front, is solidly built up for three or four blocks back from the river. Third avenue, which in 1898 contained only a few scattered buildings, is becoming the retail or shopping street.

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While there have been no marked advances in the prices of real estate, the market is firm and is likely to remain so for some years, as the opening up of the rich bench and hillside diggings and other new developments on old creeks insure to the camp a long life.

As a result of the adoption of a good drainage system, the sanitary condition of Dawson is greatly improved, and it is now as healthy a town as can be found anywhere.

The municipal government is a model one in every way, and there is almost a total absence of petty crimes, while but one murder was committed during the winter.

The town has a well-organized volunteer fire department equipped with apparatus which cost \$30,000.

The Good Samaritan Hospital, a Protestant institution recently established, is doing good work and can accommodate about the same number of patients as the old hospital described in a former report. The government contributes \$15,000 per annum to the support of these institutions.

There are four churches, which hold regular services, that are well attended.

There are about 50 saloons in the town, which pay to the government an annual license of \$2,000 each. They are required to close at 12 o'clock (midnight) Saturday and are not allowed to reopen until 6 o'clock Monday morning. This rule applies to all classes of business, except in cases of necessity, when permits are issued. With two or three exceptions, the saloons have reduced the price of drinks to 25 cents, but the wages of barkeepers, faro dealers, etc., remain at the old figures of \$1.50 and \$2 per hour. A marked improvement in the morals of the town is apparent, and, compared with the increase of population, far less money is spent in saloons than formerly.

About 15,000 men were employed in mining during the winter; probably one-half of them working for wages and the others being engaged on lays, working individual claims, and prospecting. As a rule the lay men were unsuccessful, which fact can be attributed largely to lack of experience, most of them having no practical knowledge of mining.

There has been a large reduction of wages in the mines, the prevailing rate now being 70 cents per hour without board, or \$5 per day with board, for the mining season. A few claim-owners continue to pay the old rate of \$1.50 per hour for skilled miners.

Mechanical labor, such as woodworking, blacksmithing, etc., is paid for at the old rate, \$1.50 per hour, mechanics furnishing their own tools. Many carpenters have come into the country without tools, most of whom could find profitable employment but for their negligence in this respect.

There has been a material reduction in the cost of living in the Klondike during the past season. Flour, which sold in 1898 for \$16 per hundred, now sells for \$10, and other commodities have undergone a like reduction in price. Many small traders have established themselves in town and on the creeks, and the retail prices fixed by the commercial companies no longer control the market. The old companies are becoming wholesalers, and the small traders are rapidly securing control of the retail trade.

About 1,500 head of beef cattle were brought in during the summer, as well as a large supply of fresh mutton and pork. The ruling prices were 50 cents per pound for beef and 75 cents per pound for mutton and pork.

There are 50 or 60 restaurants, and the prices of meals range from 50 cents to \$1.50. The better class of restaurants supply their regular patrons with meals for \$15 per week. Good cooks receive \$10 per day, and waiters are paid from \$25 to \$40 per week with board. Notwithstanding the liberal wages paid, there are many idle cooks and waiters walking the streets in search of employment.

The output of the Klondike gold fields for the season of 1897-98 was estimated in Bulletin No. 19 of the Department of Labor at \$12,000,000. This figure is accepted by the bankers, commercial companies, and government officials at Dawson as correct, although the output is placed as high as \$15,000,000 by some other authorities. The output of gold for the past season (1898-99), according to data obtained from the same sources as for the preceding year, was \$17,000,000, divided among the creeks as follows: Eldorado, \$4,000,000; Bonanza, \$3,000,000; Dominion, \$4,000,000; Hunker, \$1,500,000; Sulphur, \$1,000,000; Gold Run, \$1,000,000; Bear, \$250,000; other creeks, \$750,000; bench and hillside claims, \$1,500,000.

The government collected \$700,000 in royalties. The exemption from the royalty tax has been raised from \$2,500 to \$5,000, and this is the only change that has been made during the year in the mining regulations. There is still widespread complaint against the exactions of the government. It is estimated that the receipts of the gold commissioner's office, inclusive of royalties, will reach \$1,700,000 for the year 1899. Less than \$100,000 of this vast sum has been expended for the benefit of the community from which it was taken.

Eldorado Creek showed a production for the season of over \$4,000,000, and thus maintained its position as the richest creek in the district. It has been demonstrated that the pay streak extends farther up the valley than was formerly supposed, and very rich ground has been found as far up as claim No. 39. Several valuable claims are being developed in the thirties, 36 and 38 being exceptionally good. On the west side of the creek, opposite 30, good pay has been found in the benches, which are being worked profitably.

Bonanza Creek produced \$3,000,000 during the season, about the same as the year before. On account of the royalty tax, no summer work was done on the upper portion of the creek. The creek claims on Bonanza, from 10 below Discovery to the mouth, produced very little gold compared with the output of the preceding season. On account of the royalty tax and the scarcity of wood, the owners generally allowed their property to lie idle, simply doing representation work. It is conceded that this portion of the creek can not be worked profitably under present conditions, and it will lie idle until more economical methods can be introduced. While the creek claims in this vicinity have proved a disappointment, very rich pay has been found in the benches and on the hillsides on the south side of Bonanza from the mouth of Skookum to 25 below Discovery. There are some 50 claims in this string which were worked profitably, having produced about \$500,000 during the season. From 25 to 70 below Discovery not much hillside mining has been done. At or near 70 below, the pay streak has been found in the hillsides on the north side of the creek and traced over the hills to the Klondike, a distance of 2 miles. Some good hillside claims are located in this vicinity, and they will undoubtedly be profitably worked under economical methods. The principal bench claims in the Bonanza Valley are near the mouth of Skookum. Gold Hill, which faces Bonanza between Eldorado and Skookum, has proved exceedingly rich. One claim there, which was bought for \$50,000, produced \$250,000 during the season. The aggregate output of the newly-developed bench claims was about \$1,500,000, and more than offset the reduced production of the creek claims on Bonanza. Hillside claims have a frontage of 100 feet, and extend from the junction with the creek claim to the top of the hill, in some instances 300 or 400 feet. No definite ruling has ever been made as to the boundary between creek and hillside or bench claims, and this fact seriously affects values.

On Hunker Creek very rich pay has been found in the vicinity of Discovery, and good pay extends for 2 miles above and about the same distance below Discovery. Although the lower portion of the creek was not worked to any great extent, the output was \$1,500,000, or about \$500,000 more than the preceding season. It was worked down to 60 below Discovery, and that claim showed up better than any other below 20, producing about \$100,000. With few exceptions, the claims in that portion of the creek can not be worked profitably under present conditions. A number of bench claims have been opened up, but they have been worked in an indifferent manner and without satisfactory results. The pay in Hunker seems to cease at 20 above Discovery, and nothing has been found in the hillsides. No steps have been taken to work Lower Hunker, but a number of good bench claims have been found in that vicinity. The Klondike Government Con-

cession Company, mentioned in a former report, is having a survey made for hydraulic operations, but no machinery has been placed on the ground, nor have any steps been taken to clear the land of timber, etc.

It has been clearly demonstrated that there is gold in paying quantities in Gold Bottom, a tributary of Hunker, for a distance of 3 miles from its mouth, but the ground is so deep and the cost of operation so great that the creek as a whole has shown no profit.

On Last Chance, a tributary of Hunker, good pay has been found for some 3 miles above the mouth. No. 27 proved very rich, two men having taken \$10,000 from a small hole. Rich benches have been found on the lower part of the creek. Last Chance produced about \$100,000 as the result of indifferent work.

With the exception of Gold Bottom and Last Chance, no tributaries of Hunker have shown any value.

Dominion has fully justified expectations, having produced about \$4,000,000. Nothing of value has been found higher up than 8 above Upper Discovery, but from that point to 10 below Lower Discovery, a distance of 7 miles, much work was done, and, generally speaking, the creek proved rich. Good pay is reported as far down as 5 miles below Lower Discovery, but, very little development work having been done there, that portion of the creek is not yet proved. Opposite 30 and 31, below Lower Discovery, good pay has been found in the benches, and it is believed that the pay streak extends for a considerable distance down the valley, although it is as likely to be found in the benches as in the creek. The lower portion of Dominion is unworked. It resembles Lower Hunker, being wide and deep. There is a good supply of wood on the creek, and the ground is comparatively shallow, ranging from 12 to 20 feet in depth. Much of the creek can be worked in the summer by ground-slucing and hydraulic methods. About a mile above Lower Discovery some very good bench claims have been opened up. Not much work has been done on them, but no doubt many rich claims will be developed in that vicinity.

The principal tributary of Dominion is Gold Run. Early in 1899 the value of claims on this creek ranged up to \$25,000, that sum having been offered for one claim and refused. Considerable work was done on the creek, and it is probable that the output reached \$1,000,000. No benches have been found on Gold Run.

Caribou Gulch, a tributary of Dominion, produced some gold toward its head waters during the season of 1897-98, but the lower portion of the creek, although crosscut and thoroughly prospected, showed no value; but quite late in the past season very rich bench claims were found at the lower end of the creek.

Eureka Creek, a tributary of Indian River, was worked profitably during the winter, about 200 men being employed. The creek, which forks 2 miles from the mouth, is located for a distance of eight miles. No accurate data as to the output could be secured, but it is believed that the creek will be a good producer.

Sulphur Creek produced about \$1,000,000. No. 26 above Discovery is considered very rich. The creek has been worked and gold found from 60 above to 60 below Discovery, a distance of about 12 miles, but it has been worked only in spots. The ground is very deep and the pay streak shallow in most portions of the creek. In the upper portion but little pay has been found in the creek, but rich pay has been found in the benches in that vicinity.

Quartz Creek has not produced anything of value, although good bench claims are reported to have been found along that stream.

None of the lower tributaries of Indian River have produced any gold or even shown encouraging prospects. This statement is true of all the streams entering the Yukon between Indian River and the Klondike, and all claims on these creeks have been abandoned.

Bear Creek has shown no value except near the mouth, all the upper part of the creek being barren. The output for the season was about \$250,000.

None of the upper tributaries of the Klondike, including Too Much Gold and All Gold creeks, have proved of value, and it would seem that they are outside of the gold belt.

The only hydraulic work of any importance so far undertaken in the district is on Australian Creek, a tributary of Indian River. Preparations are being made for extensive operations there, and machinery, supplies, etc., are being carried in by pack train. The work is being conducted by an English-French syndicate, and about 40 men were employed during the past season.

The problem as to the practicability of dredging the beds of rivers is still unsolved, as no attempts have been made in this direction.

No quartz has been found in the Klondike district.

Steam thawing machines, which have been generally adopted in the winter diggings, have proved a great success. They effect a saving of 75 per cent in the cost of

fuel and make it possible to run shallow drifts, thus avoiding the expense of timbering, which was often necessary under the old method of burning.

The boom days of the Klondike are at an end and the era of high wages and exorbitant prices is drawing to a close. The mining industry and all ordinary business and commercial enterprises are firmly established on a solid basis. It would be presumptuous to attempt to predict the length of time that will be required to exhaust the gold deposits that are known to exist in the immediate vicinity of Dawson. It may be stated, however, as the opinion of well-informed mining men, that at the present rate of production it will take ten years to work out the creeks and benches now proved to contain gold in paying quantities. It is reasonable to presume that during this period the district will support a population of fifteen or twenty thousand. The most important factor in this estimate, and one which will revolutionize placer mining throughout this northern region, is the existence of gold in the hillsides far above the beds of the creeks. On many of the richest creeks gold has been found to the hilltops on both sides of the creek, as well as in the creek bed itself. Moreover, it can be accepted as a general rule that where the pay streak is lost in the creek it can be found in the hillside. This rule holds good on every creek in which pay has been found in the Klondike district. The same condition is conclusively proved to exist wherever gold has been discovered in the Yukon region, notably at Forty Mile, Birch Creek, Rampart, and on the head waters of the Koyukuk, and the developments during the past summer at Nome indicate that the same formation exists there. In brief, it can be stated positively that gold is much more generally distributed throughout the Yukon Basin and northern Alaska than was formerly supposed.

The Forty Mile district showed satisfactory developments during the past season. A large number of people went down from Dawson during the fall of 1898, and there were about 1,500 men at work in the district, mostly engaged in prospecting, and distributed as follows: Canyon Creek and Walker's Fork, 175; O'Brien Creek, 50; North Fork (including Wade Creek), 900; Chicken Creek and Mosquito Fork, 175; various other tributaries, 200. The town of Forty Mile contained a population of 250, of which 15 were women and 80 Indians.

Jack Wade Creek, a tributary of Walker's Fork, has proved rich. The creek, which lies in American territory, is about 15 miles long and is located for its entire length in 1,000-foot claims. Two claims about 3 miles from the mouth of the creek were sold last summer to Dawson operators for \$35,000. On this property nuggets weighing from 1 to 3 ounces have been found. The pay streak is 150 feet wide. Average pans show from 25 to 60 cents, and as high as \$11 to the pan has been found on bed rock. A large number of bench claims have been located. There is a good supply of water and an abundance of timber. Many miners entered the district during the past summer, and it is probable that the creek will show a population of 2,000 next year. Two or three of the tributaries of Jack Wade Creek prospect well at their mouths, but no development work has been done on them.

Chicken Creek, which was expected to show extensive diggings, has proved a disappointment. There are three or four rich claims on the creek, two of which were worked last season and produced about \$150,000. These claims are near the head of the creek. The lower portion of the creek has not shown any valuable ground, but it is possible that the pay streak may be located in the benches.

Gold has been found in the benches on several streams in the district, and the indications are that many rich benches will be discovered.

The output of the district for the season of 1898-99 is estimated at \$250,000.

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The American Creek district showed no new developments during the past season. In the fall of 1898 Eagle City had a population of 1,300, but by Christmas this number had dropped to 400, and on September 15, 1899, there was less than 40 people in the town. About 140 men passed the winter on the creeks, but they did very little effective work. It has been impossible to secure a statement of the output, but it is probable that not more than \$25,000 was taken out. American Creek is staked from 43 above to 40 below Discovery, a distance of nearly 20 miles, and Discovery Gulch contains 20 claims.

There are many claims on these creeks which could be profitably worked, but they are largely held by nonresidents, who simply represent their properties and hold them for speculative purposes. This condition exists in every mining camp on the American side, and will continue until the Government amends its elastic mining laws in the interest of the working miner.

Star City, at the mouth of Seventy Mile River, has 40 cabins, but on September 15 was practically deserted, all but two or three men having left for Nome. About 250 men spent the winter on Seventy Mile and its tributaries, but no results are reported.

As stated in a former report, there are large areas of good hydraulic ground in the district, but it must await the introduction of machinery and more economical methods.

Fourth of July Creek, which comes into the Yukon from the westward about 80 miles above Circle City, has proved a disappointment. There was a stampede to this creek in the summer of 1898, and it was thought to be rich; but no pay was found and the district has been abandoned.

A small village of 10 or 12 cabins has sprung up at the mouth of Charley River. Seventy-five men were prospecting on the stream and its tributaries during the winter, but nothing of value was discovered.

Circle City on January 1, 1899, contained a white population of 625, including 85 soldiers, 32 women, and 7 children. The Indian population numbered 26. On September 15, 1899, nearly everybody had left for Nome, and the white population had dwindled to 55, including 20 soldiers and 13 women. The Birch Creek diggings last season showed the smallest output since the discovery of gold in 1893. Less than 100 men were employed on the creeks, taking out about \$250,000. The stores of the three commercial companies were greatly overstocked, shipments having been made on the assumption that the town would contain a population of at least 2,000 this winter.

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Fort Yukon is practically deserted, there being only two or three white persons in the place in September. No discoveries of gold have been made on the Porcupine and Beaver rivers, and those streams have been abandoned by prospectors.

Rampart City (Minook) has barely held its own. On August 20, 1899, there were about 300 people in the town, of whom 35 were women, and there were about 200 men on the creeks. By the close of navigation the population was greatly reduced through departures for Nome, and it is probable that not more than 200 people are passing the winter there. The output is estimated at \$150,000, or about the same as the preceding year.¹

Good prospects have been found on Eureka Creek, a tributary of Baker Creek, which enters the Tanana River from the eastward about 70 miles above its mouth. A pay streak 5 feet deep and 40 feet wide, averaging 5 cents to the pan, has been located on one claim; but as the ground is deep and there is not an adequate supply of water, work can not be conducted profitably at the present cost of labor and supplies. The district was practically abandoned during the winter on account of the Nome stampede.

In September, 1899, sensational reports were received at St. Michael and Nome of a rich strike on the upper Koyukuk, and this news was no doubt transmitted to the States. It was reported that ground which yielded \$100 per day to the shovel had been opened up on Slate and Myrtle creeks, tributaries of the Middle Fork. The first and only authentic information received relative to this new strike is contained in a letter, dated January 18, 1900, from the representative of one of the commercial companies at Bergman, a trading post located on the Koyukuk about 525 miles above its mouth. The following statement is taken from that letter:

"There is a gold belt running almost east and west and cut first by the Allenkaket River, 12 miles above Bergman, where good prospects have been found and some 12 or 14 men are now at work. Then comes Johns Creek, about 3 miles above Clow, our new station, which taps the belt, and we expect just as good results from it as from any of the others. Then 10 miles above that is Wild Creek, where they are doing considerable practical prospecting. Platinum in paying quantities has been found with the gold, averaging 3 grains of platinum to 1 grain of gold, and it is expected to pay in gold alone; but up to the present time there has not been enough work done to prove this statement. The men are still at work and we expect to hear from them favorably any day.

"Next comes the North Fork of the Koyukuk. That was struck late last fall by inexperienced men; but the surface prospects they found were sufficient to cause a stampede from Myrtle and Slate creeks, and a number have neglected their claims there to prospect on the North Fork. Myrtle and Slate creeks are tributary to each other, and empty into the Middle Fork. They are the creeks on which pay was first found, and though up to the present time there has been nothing startling found, it has been proven that they are rich. There was some sluicing done last summer and good money made, but had the parties known how to mine they would have made three dollars where they made only one. They were so careless in their cleanup that after they had quit work and started down for supplies other men found pieces of gold in their boxes weighing as high as \$2.

¹ Information received at St. Michael February 1, 1900, indicates that there are about 300 men at work in the Rampart diggings. Little Minook and Little Minook, Jr., are said to be the best creeks, and good results are being obtained from winter work.

"Just over the divide from the head of Slate Creek is Lake Creek, which empties into the South Fork of the Koyukuk, where they have found good prospects.

"Then the South Fork itself has developed some bench claims that promise big returns with an expenditure of a few thousand dollars in machinery for hydraulic purposes. These benches have been prospected and rich gravel found, but as yet they have not reached bed rock. So we do not know how deep it is to bed rock, nor whether there is pay on it or not, but they have a pay streak from 5 to 19 feet deep and 300 feet wide that averages 6 cents to the pan, and sometimes they find pieces that go as high as \$1.75.

"This is all we know at present in regard to the extent of the country, but if it was measured it would certainly cover an area of 20 miles in width by at least 100 miles in length, it being all of the latter distance in a direct line from the Allenkaket to the South Fork of the Koyukuk, with all these streams cutting through the belt at different points. There are other streams that are supposed to cut into this belt, but as yet no one has been on them; so we know nothing about them.

"Our new town site (Clow) is situated 80 miles above Bergman, which puts it within 55 miles of the farthest diggings we have, with the exception of the Allenkaket, and the miners on the Allenkaket will have to depend on Bergman as a base for their supplies for the present.

"Distances from Clow are as follows: Slate and Myrtle creeks, 55 miles; Twelve-mile Creek, 43 miles; North Fork, 24 miles; Wild Creek, 14 miles; Johns Creek, 3 miles.

"The diggings on the South Fork are less than 50 miles from Clow, by making a portage of about 15 miles from the South Fork to the Middle Fork.

"There are about 150 miners in the country at the present writing, and they are all cheerful and hopeful and working hard. In December, 21 men came in from Circle City. They are all practical miners, and as soon as they had looked around for a few days every one of them became interested in property, either by buying an interest or taking a lay on the different claims. They all say that the country looks well and that they are satisfied to stay with it. This has improved the spirits of all the men in this region, and they have gone to work with renewed energy."

This information is accepted as reliable, and several old residents of the Koyukuk now in Nome express their determination to return there. Even if the reports should receive no further verification, it is probable that an important stampede for the new gold fields of the upper Koyukuk will occur during the coming summer. Leaving out of consideration the possibilities of rich finds, the inaccessibility of the new section and the uncertainties of the enterprise offer irresistible attractions to the typical prospector.

* * * * *

GOLOVIN BAY AND NOME.

A number of men, who were unable to secure transportation from St. Michael to Dawson in the fall of 1897, passed the winter of 1897-98 on Fish River, a tributary of Golovin Bay. They were attracted by the fact that a silver mine located on one of the tributaries of Fish River had been successfully worked for several years, and by the reports of natives that gold had been found by them on some of the streams in that vicinity. Considerable prospecting was done on Fish River and its tributaries during the winter. Good prospects were found on a number of creeks, and Sweetcake and Ophir, the best creeks so far opened up, proved rich. Fair returns were secured from such desultory work as could be done during the summer of 1898. The lack of supplies made it impossible to engage in extensive operations. On account of the discovery of rich placer diggings at Nome, the Fish River mines were practically deserted during the past summer, but many of the owners of property there have returned this winter, and active mining operations will be carried on during the coming summer, with every assurance of success. Golovin City (formerly Council City), the distributing point for the Fish River placers, contains a population of about 150 at the present time.

In September, 1898, N. O. Hultberg, H. L. Blake, John Brynteson, and J. L. Haggalin sailed from Golovin Bay in a 5-ton schooner for the purpose of prospecting for quartz in the exposed ledges along the coast to the westward. When in the vicinity of the present mining camp of Nome, a heavy storm arose, and they were washed into the mouth of Snake River, a shallow stream which empties into Bering Sea about 13 miles west of Cape Nome. The storm continued for several days, and since the party had nothing to do but wait for better weather, they occupied the time in prospecting the streams in the barren hills 4 or 5 miles back from the beach. They prospected two or three creeks with surprising results, getting from 50 cents to \$1 to the pan a foot below the surface. They staked Anvil, Dexter, and Glacier

creeks and Snow Gulch, and organized the Cape Nome mining district, extending along the coast for 20 miles to the westward from Cape Nome, and embracing the Nome, Snake, and Penny rivers and their tributaries. Recently Penny River and its tributaries have been made a part of the Cripple and Granite mining districts. After the storm subsided the party went back to Golovin Bay, with the understanding that when they secured supplies they would return to Snake River. The original discoverers organized another party, consisting of John Brynteson, A. N. Kittleson, Eric O. Lindbloom, Japhet Lindeberg, G. W. Price, and a Laplander named Johan Tornensis, and about the middle of October this party sailed from Golovin Bay for Snake River. On their arrival they ascended the stream to the point previously reached. Here they prospected, with even better results than the first party secured. After they had panned three days, washing out from \$30 to \$100 a day, they made two crude rockers. One was set up on No. 8, Anvil Creek, and the other on No. 1, Snow Gulch. The weather was freezing at the time (about October 30), and the rockers were covered with ice, so that it was necessary to heat water to keep them in operation. The party took out \$1,800 in three days, and then returned to Golovin Bay, a distance of 90 miles, overland, as the river was frozen and there was too much ice in Bering Sea to venture out with their schooner. Some of the party remained at Golovin Bay, and others started for different places along the coast, Kittleson going to St. Michael, where he arrived December 1. He met two or three parties on the trail, who were on their way to the Golovin Bay district, but when they learned of the new strike they changed their plans and proceeded to Snake River. Among these were R. T. Lyng and Edwin Englestadt and several of their friends. On the day of Kittleson's arrival at St. Michael two outfits started for Snake River, one with a dog team and the other with reindeer, and from that time on they were going and coming all winter, sometimes two or three parties leaving St. Michael on the same day.

By April 1 a camp of considerable size had sprung up at the mouth of Snake River. The town was at that time called Anvil City, but the name has since been changed to Nome, to conform with the designation of the Post-Office Department. The original name of the town, as well as that of the principal creek in the district, was suggested by the shape of an immense rock on the top of a mountain 5 miles back from the beach, and which from that point of view has the appearance of an anvil. At that time about fifteen hundred 20-acre claims had been located, and nearly all of the creeks for many miles into the interior had been staked. When it is considered that the claims staked at the date named, if placed in a string, would stretch the entire length of the State of Illinois, it must be admitted, even by those who deprecate the use of powers of attorney in locating mining claims, that this little band of hardy pioneers were, to say the least, very industrious.

Before the opening of navigation in the spring of 1899 the news of the strike at Nome was generally known throughout northern Alaska and as far up the Yukon as Dawson. It attracted but little attention and created no interest in the Klondike region; but almost the entire population of the Golovin Bay district and many from St. Michael and the small camps on the Lower Yukon made haste to get to Nome. By May 15 there were about 250 men in the camp. At that date a few log cabins had been built, but most of the people lived in tents. The schooner *Bear*, from Unga, was the first vessel to arrive. She dropped anchor on May 28 at the mouth of Nome River, $3\frac{1}{2}$ miles east of the present town of Nome. On June 8 three whalers arrived, and these were followed, on June 17, by the steamship *Garonne*, with 150 passengers. These accessions brought the population up to about 400. Many vessels arrived during the succeeding six weeks, and by July 10 the population of the district had increased to 2,500. Probably one-half of this number came from points on the Upper Yukon.

Water began to run in the creeks on June 20, and active mining operations were soon under way on Anvil, Glacier, and Dexter creeks and Snow Gulch, which are situated from 5 to 8 miles from town.

Anvil, as far as shown by developments, is the best creek in the district. It is about 7 miles in length and empties into Snake River 4 miles in an air line from the beach. There are about 30 claims of 20 acres each and a few fractional claims on the creek. The ground is shallow, running from 2 to 5 feet in depth, and the pay streak has been proved to be over 150 feet wide on several claims. Discovery is a little more than halfway from the mouth to the head of the creek, and from No. 3 below Discovery to the head it has proved to be very rich. No. 1 below yielded as high as \$14,000 in a clean up, and produced \$115,000 during the season. No. 8 above produced \$192,000, and two or three other claims passed the \$50,000 mark. Many large nuggets have been found on Anvil, No. 1 below Discovery having produced two weighing \$213 and \$320, respectively. Quartz, Specimen, and Nickola gulches, tributaries of Anvil, appear to be as rich as the creek itself, but they are short, none

of them having more than two or three claims. Good prospects have been found on the bench claims on Anvil, but their value is not yet proved. Some sales have been made at prices ranging from \$45,000 to \$75,000 for a 20-acre claim.

Over the divide to the westward of Anvil is Snow Gulch, which empties into Glacier Creek. This is a short gulch, having but three claims and a fraction, but it contains the richest ground yet opened up in the district. Nuggets weighing as high as \$150 have been found. In a run of twenty-four hours \$7,000 was taken out, with three men shoveling in. The gulch produced about \$300,000 during the short season. Drifting is being carried on at present, the deepest point to bed rock being 11 feet. The gravel is dry and easily worked. One dump taken from a pay streak 5 feet deep and 20 feet wide averaged \$6 to the pan. If the ground untouched averages as well as that which has been worked, the four claims on this gulch will produce \$1,000,000 apiece.

Glacier Creek, a tributary of Snake River, is about the same length as Anvil, but is wider and carries more water. It is probably as rich as Anvil. Discovery is about 2 miles from the mouth of the creek. No. 2 below and No. 3 above have been developed and proved to be rich, and good prospects have been found as far up as No. 8 above.

Dexter Creek, which heads over the divide to the eastward from Anvil, is a tributary of Nome River, which runs parallel with Snake River and empties into Bering Sea $3\frac{1}{2}$ miles east of the mouth of the Snake. Dexter is rich, but the supply of water was insufficient for sluicing during the latter part of the season, and since no ground was opened up early in the season no great output was reported. As high as \$300 a day was taken out with a rocker. Some of the largest nuggets produced in the district came from this creek, many weighing from \$25 to \$80 apiece. On one claim two men shoveling onto a dump in the absence of water picked out \$300 worth of nuggets from the dry gravel in one day.

Dry Creek, a tributary of Snake River, and Mountain Creek, a tributary of Glacier Creek, are rich. Bed rock has not been reached, but as high as 50 cents to the pan has been found.

Bonanza, a short gulch running parallel with Mountain Creek and emptying into Glacier, has but two claims. One pan of gravel taken out 18 inches below the surface produced \$4.60.

There are many other creeks—Lindbloom, Gold Bottom, Bourbon, Sunset, Monument, Moonlight, Little—all tributaries of Snake River, which were prospected during the season. No large output was reported from any of these creeks, but they are likely to prove rich, as coarse gold has been found on all of them.

Osborne and Buster creeks, tributaries of Nome River, and Lillian Creek, a tributary of Buster, promise to be good producers.

Just above Buster is Dewey Creek, which prospects well, but no development work has been done.

Next above are Mineral and Basin creeks, both of which show 50 cents to the pan and a pay streak at least 50 feet wide.

Just above Basin Creek is Sampson Creek. Then come Manila, Hobson, and Schley creeks. Good prospects have been found on all of these streams, but no development work has been done.

Besides the creeks designated, there are many other tributaries of Snake and Nome rivers which show good prospects and promise large returns.

About 250 men worked for wages on Anvil Creek during the season, 200 men were employed on Glacier and Snow, and about 200 found employment for wages on other creeks. Wages in the creek digging were \$5 per day and board, with a bonus of \$3 per day at the close of the season for continuous service.

Since there was no systematic method of shipping gold dust, it has been impossible to secure an accurate statement of the output of the creek diggings, but it is conservatively estimated at \$1,200,000.

At this point the account of the financial results of the first year's operations at Nome would cease were it not for the remarkable development of the beach diggings during the summer. Before taking up this subject it will be necessary to review briefly the situation at Nome in June and the early part of July. During this period several hundred men who had spent the winter in idleness on Kotzebue Sound or in other unproductive sections of Alaska arrived at Nome, and by July 10 there were 1,000 destitute men in the camp. It was impossible for more than a very small percentage of these men to secure work, for there were but limited opportunities for employment, either on the creeks or in town. Only a small number of claim owners were working their claims; in fact, there were comparatively few claim owners in the district, since a large proportion of the claims had been located by power of attorney for nonresidents, who were holding them for speculative purposes. This idle class contended that the claims should either be worked, thus giving them employment, or be thrown open for relocation by bona fide locators, in accordance with the letter and spirit of the United States mining

laws. It was also contended (and this contention seems to be borne out by the facts) that a large number of claims had been located by aliens, principally by Laplanders in the employ of the reindeer stations. By using the reindeer furnished by the Government for the beneficent purpose of supplying sustenance to the half-starved natives along this barren coast, these favored foreigners were so well equipped for their enterprise that they frequently outstripped their less fortunate domestic competitors in the race for a rich claim. It was charged that in some instances an individual had located for himself and absent friends twenty or thirty claims, and that not a single one of these claims had ever had a pick stuck in it. A glance through the records indicates that this charge had a basis of fact. As a consequence an era of "jumping" was inaugurated, and it is no exaggeration to say that there is scarcely a claim on any good creek that was not relocated at least twice during the three weeks ending July 10; while if a claim of any value was known to have been originally located by a Laplander, he could count on half a dozen or more energetic contestants. The attorney for one of the richest mine owners in the district has furnished the following explanation as to the alleged misuse of powers of attorney: "It is alleged that a great many claims were staked by power of attorney for people living in New York, Philadelphia, and other places outside of Alaska. This is not true. I doubt whether there are more than half a dozen locations by power of attorney in the district made for people who were not in Alaska or who could not have gotten here as easily as the man who carried the power of attorney; but inasmuch as the local law, of which the recorder had a copy, permitted locations by power of attorney, a few friends could club together and give a certain man their power of attorney to go up and locate for them, rather than that all should endure the hardships. They either grub-staked the man or paid him for his services."

The "jumping" mania comprehensively embraced everything in sight. It was no unusual experience for a man who thought he owned a town lot to arise in the morning and find four or five tents on his property, all occupied by facetious squatters, who declared in response to his protests that they would stay there until the United States court was established and removed them. At this time there was no civil government in Nome, the nearest United States commissioner being located at St. Michael, 120 miles away. The responsibility of maintaining order therefore devolved upon the commandant of the small military detachment stationed at Nome, and he and his force were kept busy day and night for ten days dispersing the angry crowds which gathered on the streets and adjusting disputed titles to mining claims and town lots.

Such was the state of affairs on July 10, 1899, on which date a miners' meeting, attended by 450 men, was held for the purpose of considering the situation. At this meeting the following preamble and resolution were introduced:

"Whereas it appears upon a careful perusal of the records in the district recorder's office of this district that but two miners' meetings have heretofore been held in the district, and that at the first of said meetings, held October 15, 1898, for the purpose of organizing this district, only six persons were present, to wit, A. N. Kittleson, G. W. Price, John Brynteson, Japhet Lindeberg, J. T. Tornensis, and Eric O. Lindbloom; and

"Whereas at said meeting, purporting to organize said district, the boundaries were so indefinitely described that it would be impossible to ascertain that any claim was in the district without an authentic survey thereof, in that said district is not defined by any natural boundaries or watersheds, as has heretofore been the custom; and

"Whereas the records of the district further disclose that a majority of the claims in the district have been located, staked and recorded, either individually or by power of attorney, by the original locators of the district without any rule or regulation governing the location, manner of recording, amount of work necessary to hold possession of said claims, or how said claims shall be marked on the ground, as authorized and required by the United States statutes, thus omitting the requisite and necessary provision for the successful and intelligent working of the claims in the district; and

"Whereas it appearing that at the first meeting organizing said district one or more foreigners were present and took part in the same; and

"Whereas it has been ascertained that claims are in possession of aliens, who are holding them in the district contrary to law, and that persons so holding have been maintained in their possession by and with the connivance and assistance of certain officials illegally assuming authority so to do, and by so doing depriving American citizens of their right to locate and work portions of the public domain for mining purposes, and also that many claims have been located and are now held under false and fraudulent documents, purporting to be powers of attorney, and we believe that in many instances assumed names have been used for this purpose; and

"Whereas, without going into more detail, we believe that the genius and spirit, intent and meaning, of the American mining laws have been ruthlessly violated, with a view to illegally usurping and holding a vast tract of the public domain, valuable for mining purposes, for the benefit of corrupt officials and unscrupulous corporations, to the injury of bona fide miners; and

"Whereas it being clear from the face of them that the present miners' rules and regulations are wholly inadequate and unintelligible, and are not in accordance with the laws of the United States and are insufficient for the proper legal location and working of the same in the district; and

"Whereas we believe that a great proportion of the claims in the district have been illegally staked and recorded without having first been prospected to ascertain the presence of mineral, as required by law; and

"Whereas, ample time having elapsed since the opening of the season in which to commence work on the recorded claims in the district, and it appearing that very few of the claims in the district are being worked, about 90 per cent of them being idle, we believe that said claims are being held solely for speculative purposes and that the spirit and intent of the law in this respect is being violated: Now, therefore, be it

"*Resolved*, That it is the sense of this meeting that urgent necessity exists for the immediate passage of a set of local laws, rules, and regulations for the governance of the district, that it may be successfully and intelligently worked and the mineral resources of the district developed as rapidly as possible; that for this purpose laws governing the number of claims to be held by any one individual, how said claims shall be staked, recorded, and worked, the manner of working, and length of time they shall be worked each season, and such other necessary rules and regulations as to water rights, roads, dumping ground, etc., as may be necessary shall be adopted."

During the reading of the preamble and resolution the commandant had entered the hall with a sergeant and three privates and placed them at the upper end of the hall with fixed bayonets. At the close of the reading he peremptorily ordered the meeting to disperse. The chairman inquired by what right the order was given. The commandant replied, "You must immediately disperse, or I will clear the hall." The chairman then asked whether the meeting would be allowed to consider the preamble if the resolution was withdrawn. The commandant responded, "The meeting must disperse, and I will give you two minutes to leave the hall." The meeting then dissolved in an orderly manner.

For several days subsequent to this meeting there was much turbulence. Among those who attended the meeting were many who violently denounced the commandant for what they characterized as "the suppression of the right of free speech." The commandant defended his action by declaring that it was the intention of those present at the meeting, if they had succeeded in passing the preamble and resolution and reorganizing the district in accordance therewith, to restake all the mining property in the district, and that he was forced to take the course he did to protect vested interests and maintain law and order. Numerous conflicts occurred between owners and adverse claimants of mining property and town lots, and the situation was hourly becoming more and more serious. On July 13 the commandant promulgated the following order:

"To put an end to apparent misunderstandings, the following statement is published:

"All disputed titles, whether to mining claims or town lots, shall at once be brought before the civil authorities for settlement. So long as the civil authorities can handle such matters the military authorities will take no action. In case it becomes necessary for the military authorities to act, the claim or lot will be held in its condition at the time, neither party being allowed to do any work to change the condition of the same.

"While there exists no objection to the holding of orderly meetings for the discussion of ordinary business affairs, in any meeting held for the purpose of acting in district affairs no person is entitled to participate excepting claim holders. Any attempt so to participate by other persons is illegal, and the proper steps will be taken to prevent it.

"Decisions and orders of the civil courts will be supported by the entire power and authority of the United States troops.

"No person will be allowed to carry firearms, revolvers, or pistols. Anyone violating this order will have said firearms confiscated."

There was no civil government in Nome at this time, and all matters of dispute were perforce referred to the military authorities. By July 27 it became apparent that the continued enforcement of the rule laid down in this order in regard to the cessation of work in case of disputed titles would soon result in the stoppage of work on the creeks and nearly all building operations in town. Therefore the order was on that date amended as follows:

"The instructions contained in the order of July 13, 1899, posted at Anvil City [Nome], will be amended so as to permit original locators at work on their claims to continue their work in the event that anyone jumps the claim. The matter can afterwards be settled by the civil authorities."

In the meantime an event occurred which soon solved the difficult problem and brought comparative peace to the community, a thing which the military authorities had about despaired of accomplishing. This was the discovery and rapid development of rich deposits of gold in the sands on the beach in the vicinity of Nome. Before proceeding with an account of this remarkable discovery a short description of the topography of the Nome district will be given.

The northern coast of Bering Sea, from Golovin Bay on the east to Cape Prince of Wales on the west, a distance of nearly 200 miles, is bordered by low tundra, relieved at long intervals by bold headlands extending into the sea. From Cape Nome to Cape Rodney, a distance of 50 miles, this tundra has a uniform elevation along the beach of 10 or 15 feet above high tide, rising to a somewhat greater elevation at either extremity, and extending back from the beach from 2 to 8 miles, to a low range of bald hills which flank barren mountains rising to a height of 2,000 or 3,000 feet farther inland. The tundra is covered with a thick growth of moss, and contains numerous small lakes and lagoons, many of which are but little if any above the level of the sea. During the summer this entire area of marsh land is almost impassable, and travel inland is exceedingly difficult. Along the entire stretch of 50 miles from Cape Nome to Cape Rodney there is a flat, sandy beach, forming a slight curve and running in a west-northwesterly direction. The width of the beach from the tundra to the water's edge is from 50 to 200 feet, varying with the slope of the beach and the condition of the tide. Nowhere in this vast expanse is there a shrub or tree. Along the creeks there is a meager growth of small willows, but they are of little use as fuel, and firewood and lumber must be transported from the beach. At the beginning of the season there were large quantities of driftwood, the accumulation of years, scattered along the beach. This driftwood is supposed to have been brought by the ocean currents from the mouth of the Yukon. At the present writing this source of fuel supply has been exhausted for a distance of 15 miles in both directions from Nome.

Gold was first discovered on the beach in January, 1899, and it was staked for a distance of 2 miles above and 3 miles below Snake River. The claims were of 20 acres each, and extended 1,320 feet along the beach and 660 feet back from the edge of the tundra. At that time gold was not supposed to exist in the beach itself. Only a few colors were found in the tundra, and it had been hastily staked on the general principle of locating everything in sight. It was thought that it might possibly be worked by hydraulic methods. The property was turned over to an association known as the Nome Mining and Development Company. About the middle of June fair prospects were found at the edge of the tundra near the mouth of Nome River, $3\frac{1}{2}$ miles east of Snake River, but no work was done there. Early in July a soldier stationed at the military post prospected in a little draw at the edge of the tundra just east of the town, and washed out from 80 cents to \$1 to the pan. This created great excitement and several rockers were immediately set up in the vicinity. The rockers were crude and the men who worked them were without experience, but they were uniformly successful, making from \$5 to \$20 a day apiece. Within a week 50 or 60 men had built rockers, and the number constantly increased until on August 5 about 400 men were rocking, being principally located on the 2 miles of beach just west of Snake River. A number of practical beach miners who had had experience in washing the ruby sands of the southern coast secured copper plates, and with this superior equipment were enabled to make from 2 to 5 ounces per day to the man. Four men working eight days with one rocker took from a space 24 by 30 feet and 3 feet deep \$5,200, or a little over \$162 a day to the man. As high as \$2.50 to the pan was taken out of this particular patch of ground. It was now thoroughly demonstrated that the beach was enormously rich and the entire community caught the beach fever. Rockers were being constructed on every hand, carpenters making from \$25 to \$50 a day in supplying the demand for their crude product. By August 10 nearly a thousand men were rocking on the beach. The crowds of discontented men who had congregated on the streets and crowded the saloons a month before had disappeared as if by magic. They were scattered along the beach for 5 miles above Snake River, where they had pitched their tents and were rocking out an average of an ounce a day to the man. During working hours the saloons and gambling houses were deserted. Many barkeepers and faro dealers spent the days in rocking on the beach, leaving a single man on watch to quench the thirst of the casual customer. Barbers closed their shops, and many others left lucrative employment in town to try their fortunes on the beach. A large number of miners who had been employed for wages on the creeks quit work, forfeiting the bonus of \$3 a day for continuous work, and joined

the wild rush to the beach. A few weeks before the town had been a scene of strife and turmoil. Now nearly everybody was happy, and peace and contentment appeared to reign on every hand.

But there was trouble yet to come. Some of the owners of claims along the edge of the tundra, realizing that in the original staking a rich strip of beach had been overlooked, had set up a claim to all the ground between their front stakes and high-water mark. In a few instances they had set their stakes forward so as to include the coveted strip, and even called on the commandant to support them in their attempt to hold the ground. Several of these claim owners had "compromised" with the miners by issuing permits at 50 cents a day per man for the privilege of working in front of their property, and at one time about 400 men were paying this fee. The commandant, acting under the provision in "An act extending the homestead laws and providing for right of way for railroads in the district of Alaska, and for other purposes," that "a roadway 60 feet in width parallel to the shore line, as near as may be practicable, shall be reserved for the use of the public as a highway," decided that this strip could not be staked, and declared it open to the public. In the meantime an enterprising young man from Skagway had staked this strip for 2½ miles west of Snake River for himself by ingeniously placing his stakes so as to include this rich ground in a 20-acre claim 60 feet wide and 14,520 feet long, and by a diplomatic assumption of ownership under this location was, at the time of the commandant's decision, collecting a fee of 50 cents a day per man from 75 to 100 gullible miners.

On August 12 the commandant was forced to reverse his decision by the receipt of the following order from his superior officer at St. Michael:

"Pursuant to instructions received from the commanding officer at Fort St. Michael, the following information is given to all concerned:

"The 60-foot strip along the front of navigable waters is Government land only in the sense that it is to be kept open, when necessity demands, for the use of the public as a highway. It can be located and worked for mining and other purposes, with due regard to the observance of these requirements. Therefore, parties rocking out gold on such locations must be stopped upon complaint from the proper locators. These decisions are the opinion of the register of lands for this district. Should parties continue to violate these rulings the rockers and other apparatus must be destroyed and offenders arrested, if necessary. Holders of claims must prosecute such offenders and not depend solely upon the troops for protection of their rights."

On August 14, two days after the promulgation of this order, the general manager of the Nome Mining and Development Company called upon the commandant for a guard to support him in his efforts to remove the miners who were rocking on the company's property without permits. The commandant, with a sergeant and four privates, accompanied the general manager of the Nome Mining and Development Company to the scene of operations. He deployed his men along the beach with instructions to inform all those engaged in rocking in front of the company's property that they must immediately secure permits or cease work. The miners collected in a body and declared, through their spokesman, that they denied the right of the Nome Mining and Development Company to the disputed strip of beach; that at the time they entered upon the disputed ground it had not been staked; that they held it by right of original discovery and location, and that they would not cease work and thus surrender their rights, but would submit to arrest in a body for the purpose of making a test case. The commandant then arrested 286 men and conducted them to the barracks, where they were placed under guard. The general manager of the Nome Mining and Development Company was then informed by the commandant that it would be necessary for the company to give bonds to cover the cost of maintenance of the prisoners until such time as a civil government might be set up, when the matter could be brought before the judicial authorities. The general manager of the Nome Mining and Development Company, recognizing the gravity if not the humor of the situation, stated that he had not expected any arrests to be made, but had supposed that the men would stop work when called upon by the commandant to do so, and that in view of this misunderstanding he would waive further proceedings for the time being and take legal action against the trespassers on his property when such action became possible. Thereupon the prisoners were discharged. Most of them returned immediately to their rockers, while a few of the more exuberant remained in town to celebrate their release from captivity.

The general manager of the Nome Mining and Development Company has furnished the following statement in regard to the trouble:

"The Nome Mining and Development Company is an association formed on January 23, 1899, by William A. Kjellmann, Amasa Spring, jr., Arthur E. Southward, Japhet Lindeberg, and Alex. Jernes. Its object is to mine and develop ground in the Cape Nome mining district, Alaska. The property now (August 22, 1899)

claimed by the company consists of twenty-three 20-acre claims, one 15-acre claim, and three 100-acre claims. Of these, eight 20-acre claims, one 15-acre claim, and three 100-acre claims were located by the company, one of the 100-acre claims being in the Sinrock mining district, and fifteen 20-acre claims were purchased from the original locators.

"The first indications of gold near the beach were found in January, 1899, by Kjellmann and Spring. It was discovered in the high river bank, about one-half mile from the Bering Sea, where from 15 to 20 large colors were obtained from a shovelful of earth and gravel taken from about 2 feet below the surface. A hole was also cut through the river ice at a point where it was solidly frozen, and excellent prospects obtained from the river bed. In March, 1899, the miners in the camp held a meeting, and in defiance of all protests made by the company's representatives, reserved 40 acres on each side of the mouth of Snake River for a town site. Later this was enlarged, so that at the present date (August 22, 1899) fully 100 acres of the company's mineral locations are occupied by persons who do not recognize the company's claim to the ground.

"Along the beach, since the recent excitement about the gold discoveries there, the company's ground has been relocated time and again, in face of all protests and notices, until in some cases there are five or six claimants to the same ground, each locator interpreting the law so that to him his location seems to be legal.

"Owing to my absence, no steps had been taken by the company up to July 20, 1899, to assert its right to the ground. At first our company desired to allow each man to take at least a 'grub stake' out of the beach, not waiving our interests, however. The reason for allowing them to do so was common charity, there being a great number of men from Kotzebue Sound who were destitute. Then, again, it would advertise the richness of our property. The numbers of men who took advantage of the company's liberality and went to work on the beach soon became a matter of serious concern to our company, and at a meeting it was decided to issue permits to men who wished to work on the company's ground, at the rate of 50 cents a day for each man. This we considered very reasonable, as they were all taking out from \$10 to \$300 a day. In one case \$4,700 was taken out in ten days by four men. It can readily be seen the amount of money the company was losing each day, when you consider that there were between four and five hundred men at work, and from various estimates that have been made, at least \$10,000 a day has been taken out of our property for the last 30 days. Notices were posted at intervals along the coast, the following being a copy:

"**NOTICE.**—The Nome Mining and Development Company has decided to issue permits authorizing the holder to mine with a rocker on the company's ground. Such permits may be obtained from the general manager upon payment of 50 cents per day for each person. Permits will be given for from one to thirty days. Anyone found working on the company's ground after August 6, 1899, without such a permit will be prosecuted for trespass and larceny."

"Before the expiration of the time many men called at the company's office, paid their 50 cents per day, received their permits, and went to work. The man whom I believe to be the ringleader of the whole trouble stopped me on the street and said that he had several men working for him on the company's property, and that he would come over the next day and apply for a permit for himself and his men. This speech he repeated several times, but as yet has failed to call. I took no action until August 14, when I called on the lieutenant in command at Anvil City [Nome] for two soldiers to act as a guard for our agent as he went along the beach and warned people off our property. No request to arrest anyone was made. The lieutenant responded in person, with a sergeant and four or five privates. I went with him to the western limit of our property, explained that some men had received permission to work our ground while others had not, and told him that we did not claim on the water side of our stakes. I then returned to our office and left our agent to go along the beach. About two hours afterwards I heard shouting, and looking toward the beach saw two soldiers marching along with some 200 miners following. Shortly afterwards I was informed by a messenger that the lieutenant wished to see me. I immediately went to him and was informed by him that he had placed some 200 men under arrest and that he wished to know what the company was going to do about it. I told him that I had not requested him to make any arrests, but merely to send over a couple of soldiers as protection for our agent. He replied that he had told the miners that they could not work on the ground without a permit, and that they had said that they would continue to work unless stopped by force, and that he had then placed them under arrest. He furthermore stated that that was his interpretation of 'protection.' It further transpired that a large number of those under arrest were working below our stakes, near the water's edge, the lieutenant telling me that I had told him we claimed the entire beach. Of course that part of it was a misunderstanding between him and me.

He released the men who had been arrested upon my informing him that our company intended to prosecute all men who worked upon our ground without permission from us. The men immediately returned to work. The next day a great number of threats were made against my life, but no actual move was made. Since then we have been awaiting the opening of the courts here.

"The principal troubles here are due to the great number of different interpretations which can be placed upon all of the United States mining laws. One party says the law means one thing, and another says it means the direct opposite; and to a disinterested outsider both parties are right."

The summary action of the commandant and its unexpected outcome had a salutary effect, and from that time until the close of the season the beach was open to all who wished to work. The number of rockers rapidly increased, and by October 1 there were fully 2,000 men working on the beach. For 6 or 7 miles above Snake River there was an almost unbroken line of tents, and profitable work was carried on at various points from 10 to 20 miles west of Nome. There were no formal regulations as to the size of rocker claims. Miners placed their rockers on unoccupied ground and marked off spaces—usually from 15 to 25 feet—along the beach, and by common consent held undisturbed possession until they had worked out their ground, when they moved farther up the beach.

The beach gold is fine and difficult to save without copper plates, which were scarce and expensive last fall. The gold is found in two principal pay streaks running along the beach and varying greatly in richness and width. The richest pay streak was found on the upper edge of the beach, next to the tundra. This varies in width from 10 to 30 feet, and in many places extends under the tundra, but here the frozen ground makes rocking unprofitable. Lower down on the beach, near the water's edge, another rich pay streak exists which varies from 10 to 20 feet in width and in many places is as rich as the upper one. At several points intervening pay streaks are found, and in some localities the pay extends the entire width of the beach, but this is exceptional. The gold is found in a layer of ruby sand, generally from 1 to 4 feet below the surface. The pay dirt varies in thickness from 1 to 6 inches and lies on a false bed rock of muck or blue clay. In several instances a second layer which proved richer than the first was found. Many marvelously rich spots were worked, most of these being at the mouth of small draws at the edge of the tundra. Sand yielding from \$5 to \$20 to the pan was frequently found in these rich places, and as high as \$72 was washed from a single pan. Coarse gold exists in some localities, pieces weighing from 50 to \$1 being common, and a 2½-ounce nugget was picked up near the water's edge several miles above town. There were many well authenticated instances in which men averaged over \$100 a day for a month or more. The best returns reported were secured from an exceptionally rich spot about 7 miles west of Nome. Here three men, using one rocker, in forty days took out \$32,000. From a hole 12 feet square and 4 feet deep they rocked out \$9,000 in three days.

Work has been actively prosecuted on the beach during the winter, and it has been demonstrated that in many places wages can be made by rocking in tents or cabins. Between Snake and Penny rivers, a distance of 10 miles, 138 cabins were built last fall, and many of the occupants are taking out pay dirt and rocking it out or making dumps which will be washed up in the spring. About the 1st of January, at a point 6 or 7 miles west of Nome, a hole was sunk through the ice 150 feet from shore. One shovelful of sand from this hole yielded an ounce of gold. The inflow of water prevented further prospecting at that time; but the finding of such rich sand at that distance from shore gives encouragement to the belief prevalent here that the richest portion of the beach is submerged. If this proves true, it will offer an almost inexhaustible field for dredging operations.

No satisfactory estimate of the output of beach gold can be made, for the reason that comparatively little of it passed through the hands of the commercial companies. As a rule the miners were reticent about their affairs; but a large number admitted that they had taken out from \$2,000 to \$5,000 apiece, and showed the gold dust to substantiate the admission. It is probable that the beach produced between \$1,750,000 and \$2,000,000.

No thoughtful man who walked along this golden street in the bright sunlight of last October will ever forget the picture presented there. For many miles along the beach double ranks of men were rocking, almost shoulder to shoulder, while their partners stripped the pay streak and supplied the rockers with water and pay dirt. Nearly all were working with an energy and dogged perseverance which suggested the husbandman shocking his sheaves and now and then casting anxious glances at the black cloud fast rising in the west. Others, seemingly less fearful of the future, were passing jokes or singing as they worked. Scattered along the lines were many of the poor fellows who had been brought down on the revenue cutter *Bear* or on coasting schooners from Kotzebue Sound, where they had spent a winter

of indescribable hardships. Ragged and half starved, and in many cases suffering from scurvy, they had been cast on the beach at Nome like driftwood, their only hope being that they might secure transportation to Puget Sound on a revenue cutter, for which they would be forced to pay the highest price ever charged in this country of high prices—the affidavit of a “destitute.” They had had visions of wealth in the north which they had failed to realize through no fault of theirs, unless it be a fault to believe too implicitly what one reads in popular accounts. But here, in this barren, forbidding waste, their dreams were coming true, for there was scarcely a man in either of these long lines of happy workers who could not return home at the close of the season with gold enough to enable him to spend a restful winter among his friends and bring him back next spring to the scene of his labors. In front of the tents men were “cleaning up,” and in numerous cases securing from 30 to 40 ounces from the day’s run of a rocker. Among these was an old gray-haired miner who had spent twelve years on the Upper Yukon, where he had never made enough in any one season to carry him through in comfort to the next. With trembling hands he exhibited the receipts of a commercial company for over \$6,000 worth of gold dust which he had rocked out in less than sixty days, and exultantly cried, “Thank God! I’m going home!”

It is probable that nowhere in the world has there ever before existed for so long a period a field of production which yielded such magnificent returns to honest labor and at the same time offered such poor opportunities for that class of men who live on the labor of others. No further attempt was made during the fall to drive the miners from the beach, for the sentiment of the community was against such action; but every outgoing steamship carried one or more paid attorneys bound for Washington in the interest of some hastily organized exploitation company. It has been impossible to secure sufficient details from interested parties here to justify a statement as to their designs. It has been equally impossible, for the reason that the United States mail service is still inefficient at this point, to learn what their agents are doing in Washington. It may be assumed, however, that there is now at the national capital a thoroughly equipped contingent of procurers seeking concessions which shall enable their principals to acquire possession of the Nome beach, and thus divert from its legitimate channels the vast wealth which lies buried there. The beach ought to be reserved, under proper regulations, for the exclusive benefit of working miners.

The successful operations on the beach and the incidental discovery that the pay extends under the tundra attracted attention to that hitherto unpromising stretch of barren marsh land. In a very short time all the tundra in the immediate vicinity of Nome was staked in 20-acre claims, and some prospecting was done during the fall. Colors were found everywhere, but the inflow of surface water prevented the sinking of holes to a sufficient depth to prove whether or not the tundra would pay. Enough was done, however, to indicate that this vast area was built up by the sea, which is constantly receding and leaving a deposit of gold-bearing ruby sand that may be as rich as that now so easily worked on the beach. This is conclusively shown in some localities by the existence of driftwood far below the surface at points a mile or more inland. During the winter active prospecting has been carried on near the town of Nome. A hole is being sunk at the eastern end of the town, about 500 feet from the beach. The ground was frozen to a depth of 16 feet, and at a depth of 22 feet a stratum of oil-bearing sand was struck. At 23 feet the original ruby sand of the beach was reached and showed prospects of 30 cents to the pan. There is no doubt that the tundra in this immediate vicinity will pay, and preparations are being made to work it on a large scale. Two miles inland, near the mouth of Anvil Creek, a hole sunk in the tundra has shown from 35 cents to \$1.50 to the pan at a depth of 18 feet, and bed rock has not yet been reached. In commenting on these new discoveries the Nome News says:

“Prospecting the tundra was suggested by Prof. Angelo Heilprin, the eminent geologist of the Philadelphia Academy of Sciences, who made a brief examination of this section last fall. Professor Heilprin was enthusiastic over the camp and its prospects. He believes that a vast ledge exists somewhere out in Bering Sea from which the gold has been deposited on the beach and in the adjacent tundra, which was once the bottom of the sea. He also thinks that the bench claims of this section will prove richer than the creek claims.”

In the same issue the News refers to this subject editorially as follows:

“That the tundra which skirts the coast of Bering Sea for hundreds of miles will be found to be rich in gold seems to be a fact that is fast approaching the fullest demonstration. Mining men of large experience and mining experts who have devoted much attention to the tundra as a probable gold producer, unite in the opinion that the tundra will prove to be almost incalculably rich in places. Gold is diffused throughout these long stretches of waste land, and where bars have been

formed by the action of the winds and waves, at a time when Bering Sea covered these plains clear to the mountains, will be found vast deposits of the precious metal. Prospecting that has already been done seems to prove this statement, and work now under way and contemplated before next spring will prove beyond a peradventure that this section is really what many of us believe it to be, the greatest gold field of any age or country."

As intimated in the foregoing extract, it is now almost conclusively shown that gold exists in paying quantities throughout the entire length of the coast from Cape Darby to Cape Prince of Wales, a distance of more than 200 miles. The beach itself is rich for 30 miles west of Nome, although showing some short stretches which will not pay under present methods. Good prospects are found all the way along the beach from Nome to Golovin Bay, about 70 miles, and near the eastern limit of this stretch of beach \$2 to the pan has recently been found within 6 inches of the surface. It can be asserted with confidence that the beach will pay (with barren spots here and there) for more than 100 miles, and nearly all the creeks along this stretch of beach and far inland have shown good prospects. Reports from Port Clarence, 85 miles west of Nome, indicate that the beach there will pay. Cape York, 25 miles still farther west, is attracting considerable attention, and reliable men report that many of the creeks there are rich. The Bonanza mining district, which adjoins the Cape Nome mining district on the east, contains many creeks which show good prospects and which will be worked next summer. The Norton Bay country, which has been pretty thoroughly prospected this winter and from which good results were expected, has proved a disappointment. The Ungaliktolik River, which flows into Norton Bay from the eastward, was the scene of a small stampede during December and January, and 40 or 50 experienced miners prospected its tributaries, but did not find anything of value. Reports from Bonanza Creek, a short stream emptying into the Ungaliktolik 7 miles from its mouth, indicate that 25 cents to the pan has been found near the surface, but these reports lack confirmation. It would seem that the gold belt runs in a northeasterly direction from Nome, across the upper half of Golovin Bay, and thence toward the head waters of the Koyukuk, thus leaving Norton Bay far to the southward. But the immense area of gold-bearing country already proved in this vicinity undoubtedly marks this as the most extensive placer-gold field that has been opened up since the discovery of gold in California.

Some promising discoveries of quartz have been made in the vicinity of Nome and on Golovin Bay. At the head of Nome River free-milling gold ore has been found, running as high as \$270 to the ton. On Fish River there are large deposits of galena ore, carrying 140 ounces of silver to the ton, which were worked for many years, the ore being shipped to Puget Sound as ballast. The low price of silver during recent years has rendered operations unprofitable, and the mines are lying idle. On the eastern shore of Golovin Bay, about 20 miles from Cape Darby, a ledge of hematite ore has recently been discovered. The ledge is 30 feet wide, lies between granite and porphyry, and is traceable on the surface for more than 4,000 feet up the mountain side. Blowpipe assays show from \$12 to \$20 in gold to the ton. This ledge is within 3 miles of the beach, where the largest ocean vessels can anchor safely within 300 feet of the shore. If the indications are confirmed by development, this ledge will rival the great Treadwell at Juneau.

The number of claims recorded in the Cape Nome mining district up to January 10, 1900, was approximately 4,500. Of these, 300 were tundra claims, 275 beach claims, and 75 quartz claims. About 500 claims were located prior to January 1, 1899, and of these nearly 300 were open for relocation on January 1, 1900, through the failure of the owners to perform representation work during the calendar year next succeeding the year of location, as required by the United States mining laws. All of these unrepresented claims were relocated, a large number of them several times over, during the first hours of January 1. The number of location notices filed for record during the ten days ending January 10, 1900, was a little over 500, and at that date notices were being filed at the rate of 50 per day. There are more than 400 creeks and gulches in the district which have been given names and on which locations have been made. The fee for recording a location notice or transfer is \$2.50. The staking of claims by power of attorney is permitted in the Nome district, a fee of \$25 being charged for recording the power of attorney, of which sum \$22.50 is turned over to the hospital fund. In some of the new districts location by power of attorney is not allowed, while in others the fee for recording such instruments ranges from \$100 to \$500, practically prohibiting their use.

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The sentiment of the community on the question under consideration is well expressed in the following statement furnished by an old placer miner who has been for several years a resident of Circle City. Although the statement was prepared

with special reference to conditions on the Upper Yukon, it is applicable to all parts of northern Alaska:

"The placer-mining industry in the interior of Alaska is paramount to all other interests. It is all there is to induce white men to come into the country and keep them here. Indeed, it is everything; for without it the interior would be but little different from the other vast arctic wilds on this continent. A few trading posts, hundreds of miles apart, would be all that would be here. The advent of civil government into the interior of Alaska brought with it the introduction of the United States mining laws, which in the States may be all right, but here their application to placer mining is mischievous and ruinous. The United States mining laws give a man 20 acres for a placer claim, which everyone here knows is more ground than one man can possibly work in a long lifetime, as the frozen ground and other difficulties to be surmounted make the working of even a small fraction of that area an enormous task. In British Columbia a man is allowed only 100 feet of a creek for a placer claim. Experience has proved this to be quite enough for one man if the claim is good and more than enough if the claim is not good, and if a man is off his claim for three days during the working season without a valid excuse the claim is liable to forfeiture. The United States mining laws allow a man 1,320 feet along a creek by 660 feet in width, and give him a year from the 1st of January following the date of location to do a hundred dollars' worth of assessment work, or ten days' work in this country. It also permits the location of claims by power of attorney. It will thus be seen that a few persons can locate a creek, say in the early part of January, and neither do any work on it themselves nor allow any one else to work it for nearly two years. The natural result of the adaptation of this outrageous and stupid piece of legislation to placer mining in this country is shown by the fact that as soon as a creek that shows any signs of gold is discovered it is at once staked from end to end, and then practically abandoned in the hope that some one will find pay on some part of the creek, and thus give a speculative value to all the other claims. At the present time there are several gangs of speculators going around the country, who have never worked in their lives and never intend to, who have located and practically locked up about a dozen creeks, so that no one will know what is in them until a year or two has elapsed, when it is believed that they will again be open for relocation, as by that time it is hoped that these good-for-nothings will be forced to leave the country on account of impending starvation. The worst feature of the case is that hundreds of others, who are willing to work and earn a living honestly, will also be forced to leave for the very same reason. Bad as the condition of things is on the Upper Yukon, it is even worse over on the newly discovered Koyukuk, as there I am credibly informed that it is not at all unusual for a man to go up a creek on a moose hunt and as he proceeds stake out the whole creek, of course using different names. One man, with whom I am personally acquainted, told me that he had altogether 103 claims, which means that he has about 26 miles of supposed placer ground locked up for a year or two. He also mentioned the names of several others who have even a still greater number of claims than he has. The result of the application of the United States mining laws to placer mining in the interior of Alaska need not be further commented upon more than to say that it furnishes an explanation of the statement that is everywhere made that "the country has gone to the dogs," or, in better language, "the country is ruined," as the miners who are willing to work have about lost hope and courage and all interest in the country, and do not care to make any great effort to find gold while the present conditions exist. It seems certain that if the present condition of things continues it will not be long before the country will be left to the Indians, the Government officials, and the troops of soldiers that have been stationed here to keep in subjection a people who have proved themselves to be the most capable of governing themselves of any people this world has ever known. Previous to the introduction of civil government the country was ruled by the miners themselves, and laws were made and enforced that were well adapted to the condition and needs of the country, and of course were fairly satisfactory. During those times crime was almost unknown, and life and property were quite as secure as it seems possible for them to be in the best-ordered community in the world. As it is now realized that those times are forever past, they are looked back to with sincere regret, although all the conditions of life were then extremely hard in every respect. In those days lawyers, professional gamblers, and professional politicians were not wanted, and in fact any man who would not work for a living was not wanted, and would not be endured; and I have not the slightest doubt that the future historian of the interior of Alaska will say of this country, as Bancroft said of California when it was in the hands of the vigilance committee, that it then possessed the best government it ever had or is ever likely to have.

“During the days when miners’ laws prevailed no man was allowed more than one mining claim in a district, and that not more than 500 feet in length, and he was required to work his claim for a full month during the working season, and if he was not on his claim on the first day of the month designated and every other day during the month, the claim was liable to forfeiture, and anyone else that wanted the claim could take it. As for a patent or title to a placer claim, no one ever thought of or wanted one. The honest, hard-working miner neither asks nor cares for anything more than to be permitted quietly and peaceably to work out his claim, and when he has done this he cares no more for the claim than the burglar cares for the safe he has just robbed. After a creek has in this way been worked out the United States mining laws could be enforced with perfect propriety, as all future work would have to be done by the capitalist, and the speculator might then be allowed his opportunity.”

This statement is worthy of careful consideration, for it undoubtedly voices the unanimous opinion of miners of the old school and all others who have studied the subject from an unselfish point of view. It is just as undoubtedly true, however, that but a small percentage of those who decry the abuses complained of are proof against temptation when the opportunity arises to do likewise. Even the honest old man who made the foregoing statement, when asked whether or not he would stake a few claims for his relatives if he had an opportunity, scratched his head thoughtfully for a moment and then replied: “Well, I never thought of that; perhaps I would—if I had a chance.” This frank answer suggests the remedy. No man ought to have a chance to locate more than one mining claim in a district. Of course no mining regulations which might be adopted by the General Land Office would entirely correct the evils existing in this region; for everything in sight, from the edge of the sea to the distant mountain peaks and far beyond, has been located, and in many instances “jumped.” But proper regulations would be of incalculable benefit to the pioneers now turning their faces toward the undiscovered country to the north and east. A placer-mining law practically embracing the following features would give general satisfaction to the miners of northern Alaska: The establishment of mining districts by natural geographical boundaries; a system of recording under the supervision of the register of the district land office; the limitation of the size of creek, bench, and tundra claims to 500 feet square, and of beach claims to 50 or 100 feet along the beach; a restriction of the number of locations by one person to one claim in a mining district and five claims in a land district, and a requirement of at least sixty days’ actual work on a claim during the open season.—(From the *Bulletin of the Department of Labor*, July, 1900.)

II.

ARIZONA.

By WILLIAM P. BLAKE,

Territorial Geologist and Director of the Arizona School of Mines, Tucson, Ariz.

The production of the precious metals in the Territory of Arizona for the calendar year 1899 was 125,678 ounces gold, valued at \$2,598,000, and 1,864,726 fine ounces silver, of a coining value of \$2,410,959.

These figures are the result of a careful canvass of the producing districts and mines and of a special and general official request for the exact data of production. Most of the leading producers responded promptly and fully, and in the case of those who did not respond close estimates have been made.

PRINCIPAL GOLD MINES.

Among the many mines regularly producing gold from veins the following merit special mention: The Fortuna, the King of Arizona, the Congress, the Crowned King, the Mammoth Collins, and the Commonwealth. These properties contributed largely and constantly to the stream of gold which flowed from the veins of Arizona in the year 1899. Each of these properties covers veins which may be regarded as representing different types of formation of gold-bearing lodes. Each group has peculiarities interesting to the student of the sources of the precious metals.

The Fortuna, in the mica slate of the Gila Range of mountains, between Yuma and the boundary line, in Yuma County, without any great lateral extent or evidence of its presence by croppings on the surface, is found to extend indefinitely downward in the form of a chimney or chute, of which it is an excellent example. The vein has been worked with profit from the surface down. It has yielded from \$40,000 to \$80,000 in value per month. The ore is free milling, and the gold is caught on quicksilvered plates, and the tailings are treated by the cyanide method.

The King of Arizona, also in Yuma County, but north of the railroad and the Gila River, is about 35 miles east of Castle Dome Landing, on the Colorado River, and 48 miles north of Texas Hill station, on the Southern Pacific Railroad. There are several claims owned by the corporation upon the quartz veins. These are of nearly normal type, but are marked by rich seams of coarse gold in the very croppings. The property is in an exceedingly arid region, and the want of water for milling and other purposes has been a serious hindrance to the development. Deep borings have, however, reached water sufficient for leaching, and possibly for milling purposes, and have also given satisfactory evidence of the persistence of the vein and that the great values shown at the croppings continue in depth. The mine is opened to a depth of 400 feet below the apex. There is about a thousand feet in length of drifting upon the vein, and about two-thirds of

this distance is in paying ore. Owing to the difficulties from want of water, the mine had no more than four months' working in 1899, and the output was of necessity small in comparison with that promised for the year 1900, which is estimated at an average of not less than \$30,000 per month in value. The collection of gold by quicksilver on plates in the common mill process has for the present been suspended at this mine, and the entire pulp is treated directly by the cyanide process, with satisfactory results. There is but little pyrites in this vein; at least it does not appear in quantity in the surface ores.

The Congress mine, in Yavapai County, is in strong contrast with the King of Arizona, being a good example of the occurrence of a rich auriferous pyrites in a regular vein with quartz. This pyrites was found in quantity near to the croppings, and in such quantities that it was shipped away in bulk to the smelters. This pyrites ore when selected for shipment carries on an average about 8 ounces of gold per ton. It occurs both massive and disseminated in grains in the quartz. There is but little free gold visible. The quartz in the absence of pyrites is barren. While the more massive rich pyrites is culled and shipped to the smelters, the leaner quartzose ores with disseminated pyrites are crushed and concentrated, roasted, and cyanided at the camp.

The vein traverses granite and gneissic rocks, and is accompanied by a dike of trap or greenstone. It is inclined at a low angle and has been followed down by the workings for over 2,500 feet.

At the Mammoth Collins gold mine, in Pinal County, north of Oracle, the vein contents are highly oxidized, and the lode is characterized by a great quantity of hematite resulting from the decay of the pyrites. The vein stone is quartz. The vein traverses a coarse-grained granite and is large. The ore, as extracted and sent to the mill upon the San Pedro River, is free milling, but the tailings are rich and are successfully treated by the cyanide process on a large scale. In some portions of this lode large bunches of lead ore are found. This ore was primarily in the form of galenite (the sulphide of lead), but by long oxidation a portion at least has been converted into lead sulphate in concretionary crusts or layers around niches of unchanged galenite. And in connection with this alteration of the sulphide considerable quantities of the bright yellow mineral known as wulfenite (the molybdate of lead) are found in close association, then in common with similar conditions of occurrence at other places, giving evidence of the association of the sulphide of molybdenum with the sulphide of lead. About 40 tons of the molybdate of lead were shipped away from the waste dump. Some very fine specimens of vanadiferous minerals have also been taken from this mine, notably vanadinite and Des Clos, suitable for cabinets of mineralogists.

There has been great activity in the working of old dumps of tailings from the gold-bearing quartz mines by the cyanide process. Most of these ventures have been successful and have added considerably to the total of the gold production of the Territory.

PLACER DEPOSITS OF ARIZONA.

The placer deposits of Arizona are numerous and are widely distributed, but with a few exceptions were not actively worked in 1899, and they do not contribute as largely as formerly to the sum of the

gold production. The general scarcity of water for washing the gold-bearing gravels renders the successful exploitations of these placers very difficult. Dry washers have been proposed and have been used to some extent, but the result in general has not been encouraging.

Some of the chief deposits of placer gold are found along the Colorado River in Mohave County and some in Yuma County. Many locations with preparations for washing on a large scale have been made on the Upper Colorado above the great canyon.

The wonderful deposits at Weaver, under Rich Hill, in Yavapai County, have long been famous and are mostly worked out, but are still producing some gold, generally coarse and high grade. Efforts have been made to work portions of the deposits by powerful excavating dredges. Water under pressure is much needed.

At Greaterville, on the east side of the Santa Rita Mountains, an extensive placer deposit has been worked for years, and still yields a few thousands of dollars worth of gold yearly to Mexican miners who make average wages. Here also the need of sufficient water is felt, and besides the fall is not sufficient for successful ground sluicing or for washing by the hydraulic method.

The placer deposits on Lynx Creek, about 8 miles from Prescott, have attracted much attention and are believed not to be worked out.

There is much fine-scale gold in the old gravelly alluvions of the San Francisco River in the eastern part of the Territory, and there is usually an abundance of water there for washing, but the gravels are generally too low down and the fall for tailings insufficient for washing on a large scale by the hydraulic method.

The dry placers of Horse Shoe Basin, in the Quijotoa Mountains, attracted renewed attention in the year 1899. It is believed that these deposits yield from \$6,000 to \$7,000 in value every year from the labor of Papago Indians, who work in a crude way with dry washers. Much of the auriferous earth is worked over by hand. One large mass taken out by these Indians was worth over \$1,000. An effort to secure a photograph or a cast of this specimen failed, because the mass was cut up by the Indians for apportionment soon after it was found.

The placer deposits of the Canada del Oro were not actively worked in 1899. These deposits are on the western side of the Catalina Mountains.

Oro Blanco, as the name implies, is noted for the occurrence of "white gold"—the electrum of mineralogists. A large part of the product of this district is not over 400 fine, the alloying metal being silver. The region is in Santa Cruz County, south of Tucson, but has not been actively worked during the year and the total production was small. Some placer gold is obtained, by Mexican labor chiefly.

BULLION AND MATTE FROM MEXICO.

In this report of the production of the precious metals in Arizona no record has been made of any estimate of the amount of gold in the form of placer dust, amalgam, or bullion in bars brought into the Territory at the ports of entry or smuggled in over the international boundary line from the adjoining State of Sonora, Mexico. Such gold finds its way in part to the banks at Nogales, Tucson, and Yuma, or is shipped to the mints at Denver or San Francisco by express, and is believed to amount to a considerable sum in the course of a year,

By the courtesy of the United States consul at Nogales, Mexico, the annexed figures of the exportation from Mexico through Nogales to the United States have been obtained. They show the amounts exported for each of the four quarters of the calendar year 1899 by value in dollars:

EXPORTS OF ORE, MATTE, AND BULLION FROM NOGALES, MEXICO, FOR THE CALENDAR YEAR 1899.

March 1. Bullion:	
Gold and silver	\$6, 987
Silver	2, 436
Ore:	
Gold and silver	600
Silver	36, 586
June 30. Bullion:	
Gold and silver	3, 215
Copper matte (88,510 pounds)	4, 560
Ore:	
Gold and silver (26,804 pounds)	997
Silver (747,716 pounds)	40, 140
Sept. 30. Bullion:	
Gold	31, 620
Gold and silver	19, 827
Silver	4, 320
Matte, copper	57, 729
Ores:	
Copper	1, 095
Gold (10,000 pounds)	10, 731
Gold and silver (3,547 pounds)	182
Silver (402,317 pounds)	27, 126
Dec. 31. Bullion:	
Gold	855
Gold and silver	16, 902
Silver	14, 387
Ores:	
Antimony	1, 407
Copper	9, 394
Gold	313
Gold and silver	7, 107
Silver	41, 878

The values here reported are not the result of assays, but are the values as given by the exporters, and as there is no provision made for assaying for the precious metals at the Nogales, United States, custom-house, the figures for statistical purposes are practically valueless. Ores containing lead and silver are assayed for lead and not for gold and silver, though no doubt all the matte imported from Mexico contains gold and silver. The values reported to the Bureau of Statistics are estimated values based upon the values given by the importers, and in some cases at least these values may be fictitious.

At the new custom-house at Naco, in March, 1900, three bars of gold bullion valued at \$12,000 were passed. This bullion was produced in Mexico on the east side of the Ajo range, about 50 miles south of the Arizona line.

SILVER MINES.

The production of silver apart from its association with gold, lead, or copper, was comparatively nil. No silver mines as such are now worked in Arizona. The Silver King, formerly a large producer, has long been practically closed. The Tiger mine, in Yavapai (Bradshaw

Mountains), where silver occurs in association with blende, has not added to the silver production, though efforts have been made to reopen and work the vein. Some silver is sent out from Arizona in the argentiferous lead ore of Castle Dome and the silver-lead ores of Mohave County, especially from the White Hill Company. Rich argentiferous lead ores are produced in the Cerro Colorado and in the Santa Ritas, Santa Cruz County. A small amount was taken from the old Mowry mine, which was reopened with the purpose of rehabilitation, but the project has been abandoned.

Tombstone continues to make a small shipment of both gold and silver ore, and there are numerous sources of small quantities of argentiferous ores purchased usually by local sampling works and agents of the smelting companies. A not inconsiderable portion of the gold and silver taken from the mineral deposits of Arizona occurs in connection with the ores of copper, and is sent out from the Territory in the copper bullion which is refined elsewhere. The figures of production include as far as possible the amount and value of the gold and silver so obtained.

III.

CALIFORNIA.

By CHARLES G. YALE.

The production of precious metals in the State of California for the calendar year 1899 is shown in the tables appended to this chapter, the figures being those obtained from returns by producers to the mint of the United States at San Francisco, in answer to interrogatories. According to these returns the yield of the State in precious metals for 1899 was as follows:

Gold	\$15, 336, 031
Silver (commercial value)	504, 012
Total	15, 840, 043

Throughout this chapter the silver is given in figures of commercial value, or amount obtained for it by producers when sold. In the total for the year the commercial value of the silver is \$504,012, as stated, the coining value, however, of this total being \$1,106,578.

Comparing the totals of gold and silver with corresponding figures obtained from the same sources in the year 1898, the gold yield shows a decrease of \$570,447, and the silver yield an increase of \$89,957, making a net decrease from previous year of \$480,490.

Of the total sum of \$15,840,043, values of combined gold and silver product, \$12,290,138 came from quartz mines, \$1,401,386 from placer mines, \$1,019,955 from drift mines, and \$1,128,564 from hydraulic mines. The sum derived from placers is doubtless somewhat larger than it should be, as compared with those of drift and hydraulic mines, as many owners of these latter claims have returned their products as from "placers" without designating exactly the form of placer. Moreover, the Chinese miners have all been classed as placer miners, while some of these have worked hydraulic claims in a small way. All the larger Chinese hydraulic mines have, however, been properly classified.

In the general phrase "placer" are included surface diggings, river bed, bar, ground sluice, dredging operations, etc.

In the returns from placer operations is included the sum of \$206,302 derived from dredging operations by machine dredgers.

In the returns from quartz mines are included the sums of \$353,743 gold and \$210,219 silver, a total of \$563,962, derived from copper-mining operations in Calaveras, Shasta, and San Bernardino Counties.

Also included in the returns from quartz mines are the sums of \$5,021 gold and \$64,620 silver, a total of \$69,641 from silver-lead mines in the counties of Inyo, Mono, and San Bernardino.

The year 1899 was the third successive year of drought in California, and this has naturally had a marked effect on the output of gold.

Not only were placer, drift, and hydraulic operations injured by lack of water, but the quartz interests were also greatly affected.

In the fall of the year numbers of quartz mills had to stop operations entirely, since there was no water for power. Many were able to run part of the stamps only, while in numbers of cases all the stamps had to be "hung up," and ore crushing was necessarily stopped.

This accounts for the decrease of the product of some of the larger mines. It is surprising, in fact, that under the circumstances the total gold yield did not show a much larger falling off, and this is only accounted for by reason of numbers of new mines having become producers. In view of these conditions, it is to be noted that the fact of the bullion product of the State showing so little decrease from preceding year should be considered as an indication of progress in the mining industry. Had water been available, much larger returns would certainly have been shown, indicating more producing mines.

In hydraulic mining numerous returns indicate that the miners had only a few weeks to operate in, their water season having been very short indeed. The drift mines, from the nature of that class of work, were less affected, yet most of these had less water than they needed.

In many parts of the State where more or less placer mining is annually carried on in the ravines, gulches, etc., little of the work could be done.

In some places, in fact, no placer work at all was carried on, where usually numbers of men gain a living working for themselves in a small way. The ditches which supplied water to the hydraulic, drift, and quartz mines, as well as to some placer fields, carried a very scant supply of water all summer, and early in the fall a number of them could not supply their customers. The result was to restrict mining operations greatly, and thereby the bullion output. The comparatively few river-bed miners had a good season, as their operations are best conducted when the streams run low.

A number of old mines, long idle, were reopened in 1899, and some of them brought to a producing stage the same year. Others, however, will not increase the bullion product until 1900, when their reduction plants are put in operation. The more economical systems of mining and milling now in vogue admit of quartz mines being worked profitably, which, a decade since, were practically worthless. Ores of a very low grade, when abundant in quantity, can be worked at a cost which a few years since was impossible. It is for this reason that so many of the old mines of the State have within the past few years been reopened and suitably equipped with improved mining and milling machinery.

In the year 1899 there were 30 counties in the State of California which produced gold, and 20 of these made some silver product. San Luis Obispo and Santa Barbara counties, which produced gold in 1898, show no product in 1899; but Ventura, which was not among the producers of previous year, makes a small return. Of the 30 counties, 6 produced over a million dollars, though only one exceeded a \$2,000,000 product. The leading county in precious-metal production for 1899 is that of Nevada, as has been the case for several years, and it is the only one showing a product of over two millions. Tuolumne County, which was third in rank in 1898, now takes second place, its yield exceeding that of Amador, which takes third place instead of

second, as in 1898. Calaveras is fourth, displacing Placer County, which this year comes fifth on the list. The sixth is Shasta County, which was fifth in the preceding year. Kern drops back out of the list of million-dollar counties, though it was among them the previous year.

As compared with the previous year, Calaveras County shows the largest increase in output, though Mono is not far behind, and Mariposa and Siskiyou make a good showing in this respect. The largest decrease in product is shown in Placer County, followed in order by San Diego, Trinity, and Amador counties. Placer and Trinity are mainly gravel-mining counties, while Amador and San Diego mines are nearly all quartz.

The dry season had a marked effect on quartz mining in Amador County, and the yield of gold and silver shows a falling off of \$256,335 from previous year. In the year 1898 the county showed the largest increase of any county in the State. The mines are almost entirely of quartz, and several of the larger ones show a materially decreased yield for the year. There are numbers of very extensive operations going on in this county, some of which, while active and employing many men, have not yet been brought to a productive stage.

Among the most productive mines at present are the Keystone, at Amador City; Argonaut, Kennedy, and Zeila, at Jackson, and Wildman-Mahoney, Baliol, Central and South Eureka, at Sutter Creek. There are 1,394 miners at work in Amador County, according to returns received at the United States mint at San Francisco, which is an increase of 174 over the previous year.

Butte County shows a reduced yield of \$31,970 compared with 1898, which is less than might have been expected, as it is mainly a gravel-mining region, where lack of water interferes greatly with hydraulic, drift, and placer operations. The work of mining by gold-dredging machines, however, which is extensively carried on around Oroville, has prevented the gold yield of the county from falling off. Several of these machines, which cost from \$50,000 to \$75,000 each, have been successfully operating during the whole of the year.

The work of these machines is not, as generally supposed, confined to river bottoms, as several are operating a mile or more from any stream in the midst of orchard lands. The miners have bought up hundreds and hundreds of acres of fine orchards, many of which have been bearing for years, as underlying the soil are rich beds of gold-bearing gravel. A pit or hole is dug at any likely point, in which is built or launched a hull or scow, on which the dredging machinery is placed.

The ordinary surface water soon floats the dredge, which then commences operations. The great endless-chain buckets elevate the gravel and earth, which pass through "grizzlies" to separate the rocks and stones and earth.

The rocks are carried by elevating apparatus far to the rear of the dredge, while the auriferous material passes through the gold-saving appliances and the tailings or refuse pass out over the stream.

The dredge keeps cutting a new basin for itself to float in as it digs away the bank ahead of it. Of course the orchard soon disappears under this system, but the underlying gold in the gravel is worth far more than the trees and their product. There is also much waste and

gravelly soil in that vicinity capable of being used by this method, and the number of dredgers is gradually increasing. Mostly these operations are conducted by companies, as the dredges are somewhat too expensive for individual miners to build and handle. These machines obtain from \$25,000 to \$75,000 a year in gold, according to their size and capacity and character of ground.

The Gold Bank mine, at Forbestown, is the only large producing quartz mine in Butte County, most of the mining work being done in the auriferous gravels by drifting, hydraulic, dredging, and surface placer mining. There are 782 miners at work in Butte County—105 less than in 1898.

Calaveras County shows an increase of \$252,922 over its combined gold and silver product of 1898, and the county takes fourth rank in the State instead of seventh, as in the previous year. The ditch which supplies water to the largest camps in the county was enlarged the previous year, so that the principal mines were not so short of water as in 1898, though there was still not a very full supply, or the gold yield would doubtless have been larger. The largest producing mines in this county are quartz, and consist of the Utica and Lightner, at Angels; Gwin, at Gwinmine; Royal, at Hodson; Esperanza, at Moke-lumne Hill; Chili Hill, at North Branch, and Petticoat, at Redwood Flat. In this county there are 1,005 miners employed, or 281 less than in the previous year.

Del Norte County mines are mainly placer and ocean beach claims which show a decrease of \$4,607 from the yield of 1898, with 15 less men at work than in that year.

Eldorado shows a decrease in yield of \$93,229, one of its largest producing quartz mines having been closed down entirely during the year. The returns show 801 miners employed, the reduction in numbers being 309, which is the greatest loss of miners in any county in the State as compared with previous year.

Fresno County decreased its yield by \$9,415, but has only a very few miners at work less than in 1898. In this county the petroleum "excitement" has detracted attention from the gold mines, which, however, are all small ones, there being no large gold-mining operations in the county.

Humboldt County has only placer and beach mines. The ocean beach mines near Eureka and Orick did well this year, which accounts for the increase of \$11,547 in the gold product, though there were 29 miners less than in 1898, or 76 in all.

Inyo County shows a product \$38,894 less than in the previous year. This is one of the silver-producing counties of the State, the silver coming mainly from silver-lead ores. There are 207 miners employed in the county—70 less than in 1898.

Kern County did not produce by \$154,249 as much as it did in 1898, and had 983 miners at work, as compared with 1,060 the previous year. Some dry placer washing is still done in this county around Goler, Red Rock, and Summit, but most of the gold comes from quartz mines. The principal producing district is around Randsburg and Johannesburg, where there are many mines in operation. The Yellow Aster, one of the largest producers among the quartz properties of the State, is at Randsburg. Among the principal producing mines of the county are the Ophir, at Havilah; Sumner, at Kernville; Butte,

Good Hope, Little Butte, Napoleon Consolidated, Sunshine, Wedge, and Yellow Aster, at Randsburg, and Glen Olive, at Vaughn.

In Lassen County the quartz mines make smaller returns by \$8,862 than the previous year, with about the same number of men employed as in 1898.

There was a gold product of \$8,168 less from Los Angeles County in 1899 than in the previous year, though practically the same number of men were employed. The quartz mines at Acton and Gorman made a small product, most of the gold coming from the placers near Newhall.

Most of the mines in Madera County are small properties worked by their owners, and a falling off in product of \$20,884 is shown. There are 169 miners at work in the county—21 more than were returned in 1898.

Mariposa County shows an increased yield over previous year of \$227,625, and this in face of the fact that there were 253 less miners at work in the mines of the county than in 1898. This loss of men is among the small operators, the larger companies which produce still employing the usual number of men. The principal quartz mines are the Merced and Louisiana, at Coulterville, the Mount Gaines, American Eagle, Carswell, and Francisco, at Hornitos, and the Whitlock and Alabama, at Mariposa. About the end of the year active operations ceased at the Mount Gaines and Whitlock, and the former has been abandoned.

Mono County shows the decided gain of \$231,932 for the year, with about 20 more men at work than in previous year. At Bodie is one of the largest producing quartz mines in the State, the Standard Consolidated, which showed a marked increase in output for the year. Large cyanide plants for working tailings are in operation at Bodie, and their combined yield is quite important. Aside from the quartz mines and cyanide works at Bodie, the only other large producer in the county is the Jackson and Lakeview, at Lundy.

Nevada County produced \$2,189,294 in 1899, or \$152,190 more than in the previous year. This is the largest product of any county in the State, and Nevada is the only one of the gold and silver producing counties which shows a yield exceeding \$2,000,000. In this county are quartz, drift, hydraulic, and ordinary placer mines, and some of the operations are on a very large scale. There are 1,834 miners at work, according to the returns received, or about 115 less than in 1898. With the exception of Shasta County, there are more miners at work in Nevada County than elsewhere in California.

The principal producing mines are the Gaston Ridge, at Gaston; the Brunswick, Empire, Grass Valley Exploration, Maryland Consolidated, Menlo, North Star, Omaha, and Pennsylvania, at Grass Valley; Eagle Bird, at Maybert; Champion, Harker and Penrose (hydraulic), Mayflower, Providence, Reddick, and Reward, at Nevada City; North Bloomfield (hydraulic), at North Bloomfield; Kate Hayes (hydraulic), at North San Juan; Spanish, at Washington, and Red Dog (hydraulic), at You Bet. At the Spanish mine, at Washington, the quartz has been mined and milled at smaller cost and with the lowest grade of ore than at any mine in the world. The mine has now, however, been given up, and operations have ceased. Of the total of \$2,189,294 from Nevada County, there was derived from quartz mines \$1,956,688; from hydraulic, \$123,911; from placers, \$68,700; and from drift mines,

\$40,015. It will be seen from this that the quartz interests are by far the most important.

Placer County, where most of the mining is done in auriferous gravel by hydraulic or drifting process, shows the largest falling off in yield for the year of any county in the State, viz, \$392,405. This is mainly due to the scant water supply, which severely affected the working of the gravel mines. There are 163 more miners at work than in the preceding year, or a total of 1,411 men. The reduced yield was mainly from larger properties, where practically the same number of men were kept at work, but more men seem to have been engaged in small operations. Of the total yield of Placer County (\$1,101,287), the sum of \$631,708 came from drift mines. The largest producing drift mines of the State are in this county, mainly in the Forest Hill and Iowa Hill divides. The principal drift mines are the Hidden Treasure, Morning Star, Red Point, Mayflower, Big Dipper, and Paragon. The principal quartz interests are at Ophir, though there is one prominent one at Towle and another at Westville.

Plumas County shows a gain of \$11,557 for the year, and an increase of 70 men at work over the year 1898. There are no very large producers in Plumas County. Most of the mining is in auriferous gravels throughout the county, though there are important quartz mines at Johnsville. Numbers of men are working for themselves in a small way in this county in placers and hydraulic mines.

Riverside County shows a smaller production by \$25,562 than in previous year, with about 200 men at work, or 25 less than in 1898. The principal seat of quartz-mining interests in the county is at Perris, but the mines there are not yielding as largely as was formerly the case.

Sacramento increases its product by \$58,605, which is mainly due to the operations of one large drift mine near Folsom. Aside from this most of the work is in small surface placers.

San Bernardino County holds its own in bullion product, the decrease for the year only amounting to \$3,310, although the returns show 79 less men employed than in 1898. This is the second largest silver-producing county of the State, though the only large purely silver mine now operating there is the Waterloo group. At Calico, where the mines formerly produced two or three millions a year in silver, only a few tributaries are at work in some of the mines.

San Diego County shows a restricted output by \$339,846, which is quite a serious falling off in product, mainly owing to the lessened yield of the largest quartz mine in the county. The miners at Julian, Banner, and Cargo Muchacha did not do as well as in previous year. There were about 65 less men employed than in 1898. Most of the mines in this county are quartz properties.

The ocean beach mines at Lompoc, Santa Barbara County, were not worked in 1899, so there was no yield from that county. The placers at La Panza, in San Luis Obispo County, were idle on account of the drought, so there was no product from this county. These counties produced about \$1,000 each in 1898.

Shasta County, which is the sixth in rank of the "million-dollar counties" of California, shows an increased yield by \$37,984 for 1899. This is the second year this county has yielded over a million dollars in gold and silver. When copper values are considered, the county heads the list of all in California, owing to the operations of the Mountain Cop-

per Company, Limited, at Keswick. The extensive reduction plant of the company has been of great benefit to gold miners since the quartz ores are purchased for fluxing purpose and certain percentages of value paid according to assay of ores. In this way the rebellious and low-grade ores may be utilized without having to be shipped out of the county. By this means claims may now be worked on a class of ore which could not bear distant shipment, and numbers of claims have been started up and made to pay. Shasta employs more miners than any other county in the State, viz, 1,875. Moreover, it was less affected by the drought than most counties, having a much larger annual average rainfall than the others. Quartz mining in this county is in a prosperous and growing condition.

Sierra, one of the high mountain counties, increases its yield by \$50,892, and also increases its number of miners by 63, a total of 608. There are many small operators in this county, both in gravel and quartz mines. A great deal of prospecting is also being carried on.

Siskiyou, in the northwestern part of the State, through which the Klamath River and its tributaries run, shows a somewhat surprising increase of product of \$222,746, though the miners up in that region had better water facilities for work than those in the central counties of California. There are a few quartz mines producing, but by far the largest proportion of the gold comes from hydraulic, drift, river bed, bar, and other gravel washings. Large numbers of Chinese are at work in Siskiyou County, and their aggregate product is quite extensive. As near as could be ascertained, about 1,578 miners are employed in the county.

The placer mines around Lagrange and Knights Ferry, in Stanislaus County, made a product of about \$10,000, which is \$9,400 less than in 1898.

In Trinity County the yield of 1899 shows a falling off of \$267,973 from previous year. The bulk of the gold comes from gravel mining, though there are a few prominent quartz mines. The returns show 146 less miners at work than in 1898. In this county, as in Siskiyou, large numbers of Chinese own hydraulic and other gravel mines. The short water season accounts for the reduced yield of the mines of the county.

Tuolumne County did not make so large a yield in 1899 as in 1898 by \$99,655. In the fall of the year many mills were idle, owing to lack of water. This is mainly a quartz county, the sum of \$1,639,843 out of the total of \$1,650,880 coming from quartz operations.

The largest producing mines in the county are the Longfellow, at Big Oak Flat; Consolidated Eureka, at Carters; Eagle-Shawmut, at Chinese Camp; Mountain Lily, at Columbia; Confidence, at Confidence; App. Cons., at Jamestown; Dutch, at Quartz; Golden Gate, at Sonora; Black Oak, at Soulsbyville; Star, at Star, and Jumper, Santa Ysabel, Golden Rule, and Fleming, at Stent. There are 1,520 miners employed in the mines of the county.

Quartz at Gorman and placers at Piru give Ventura County a gold product of \$3,990 in 1899, though the county did not appear among the bullion producers of 1898.

The mines in Yuba County are mainly those of auriferous gravel, though some little quartz mining is carried on. The county shows an increase of \$23,074 for the year.

The following table shows the distribution of the total gold and silver product of California, by counties, in 1899, based on returns received from producers at the United States mint at San Francisco:

PRODUCT OF CALIFORNIA BY COUNTIES, 1899.

RECAPITULATION.

Counties.	Gold.	Silver, commercial value.	Total.
Amador	\$1,544,868	\$6,902	\$1,551,770
Butte	486,846	5,009	491,855
Calaveras.....	1,265,564	9,813	1,275,377
Del Norte.....	4,450	.....	4,450
Eldorado	404,497	8,414	412,911
Fresno.....	18,142	.....	18,142
Humboldt.....	69,059	.....	69,059
Inyo.....	114,187	57,529	171,716
Kern	863,414	6,810	870,224
Lassen.....	28,898	.....	28,898
Los Angeles	13,132	.....	13,132
Madera.....	72,758	292	74,050
Mariposa	562,829	2,207	565,036
Mono.....	697,069	47,547	744,616
Nevada.....	2,171,510	17,784	2,189,294
Placer.....	1,100,081	1,206	1,101,287
Plumas.....	381,151	15	381,166
Riverside.....	163,010	2,000	165,010
Sacramento	115,906	.....	115,906
San Bernardino	164,599	125,603	290,202
San Diego.....	333,650	.....	333,650
Shasta.....	873,719	196,213	1,069,932
Sierra.....	450,115	359	450,474
Siskiyou.....	991,771	100	991,871
Stanislaus.....	10,000	.....	10,000
Trinity.....	590,510	1,086	591,596
Tulare.....	13,610	.....	13,610
Tuolumne.....	1,635,769	15,111	1,650,880
Ventura.....	3,990	.....	3,990
Yuba.....	189,927	12	189,939
Total	15,336,031	504,012	15,840,043
Coining value—silver.....	.....	1,106,578	.....

The following table shows the output of gold and silver in California for the years 1898 and 1899, with the gains and losses of the respective counties in comparing the two years, the figures being taken from returns by producers to the United States mint at San Francisco:

COMPARATIVE OUTPUT FOR 1898 AND 1899.

Counties.	1898.	1899.	Increase.	Decrease.
Amador.....	\$1,808,105	\$1,551,770	.....	\$256,335
Butte	523,825	491,855	.....	31,970
Calaveras.....	1,022,455	1,275,377	\$252,922	.....
Del Norte	9,057	4,450	.....	4,607
Eldorado.....	506,140	412,911	.....	93,229
Fresno.....	27,557	18,142	.....	9,415
Humboldt.....	57,512	69,059	11,547	.....
Inyo.....	210,610	171,716	.....	38,894
Kern.....	1,024,473	870,224	.....	154,249
Lassen.....	37,760	28,898	.....	8,862
Los Angeles.....	21,300	13,132	.....	8,168
Madera.....	94,934	74,050	.....	20,884
Mariposa.....	337,411	565,036	227,625	.....
Mono.....	512,684	744,616	231,932	.....
Nevada.....	2,037,101	2,189,294	152,190	.....
Placer.....	1,493,692	1,101,287	.....	392,405
Plumas.....	369,609	381,166	11,557	.....
Riverside.....	190,572	165,010	.....	25,562
Sacramento.....	57,301	115,906	58,605	.....
San Bernardino.....	293,512	290,202	.....	3,310
San Diego.....	673,496	333,650	.....	339,846
San Luis Obispo	1,000	.....	.....	1,000

COMPARATIVE OUTPUT FOR 1898 AND 1899—Continued.

Counties.	1898.	1899.	Increase.	Decrease.
Santa Barbara	\$1,000			\$1,000
Shasta	1,031,948	\$1,069,932	\$37,984	
Sierra	399,582	450,474	50,892	
Siskiyou	769,125	991,871	222,746	
Stanislaus	19,400	10,000		9,400
Trinity	859,569	591,596		267,973
Tulare	12,400	13,610	1,210	
Tuolumne	1,750,535	1,650,880		99,655
Ventura		3,990	3,990	
Yuba	166,865	189,939	23,074	
Total	16,320,533	15,840,043	1,286,274	1,766,764
Total decrease for 1899				480,490

The following table will show in detail by counties the source of gold and silver in California in 1899:

SOURCE OF GOLD AND SILVER, 1899.

Counties.	Placer.	Hydraulic.	Quartz.	Drift.
Amador	\$24,360	\$950	\$1,518,466	\$7,994
Butte	251,834	7,590	152,221	80,210
Calaveras	28,586	53,776	1,149,826	43,189
Del Norte	4,450			
Eldorado	44,791	7,942	357,984	2,194
Fresno	4,300		13,842	
Humboldt	69,059			
Inyo			171,716	
Kern	34,000	500	835,724	
Lassen	2,098	505	26,295	
Los Angeles			13,132	
Madera	4,500	69,550		
Mariposa	14,600		550,436	
Mono	2,150		742,466	
Nevada	68,700	123,911	1,956,668	40,015
Placer	242,014	55,000	172,565	631,708
Plumas	137,739	107,742	119,575	16,110
Riverside			165,010	
Sacramento	22,906	3,000		90,000
San Bernardino	3,000		287,202	
San Diego	1,000		332,650	
Shasta	18,850	1,059	1,050,023	
Sierra	60,888	87,608	253,182	48,796
Siskiyou	133,083	335,109	465,651	58,028
Stanislaus	10,000			
Trinity	102,729	268,842	219,653	372
Tulare	575		13,035	
Tuolumne	11,037		1,639,843	
Ventura	1,000		2,990	
Yuba	103,137	75,030	10,433	1,339
Total	1,401,386	1,198,114	12,220,588	1,019,955

The rate of wages paid miners varies considerably in the different counties of California. It even varies to some degree in different camps of the same county. Usually miners are paid by the day, but in some parts of the State the men are paid by the month, with or without board. Generally speaking, the wages in gravel camps are less than those where the work is quartz, and underground wages are higher than those paid for surface work. Good drill and timber men are paid a slightly higher rate than is paid to the miners.

The Chinese work in hydraulic, drift, river-bed, and other placer mines, but seldom work in quartz mines unless at surface labor. They work for themselves in placer mines, or in Chinese companies at hydraulic mining. They also work for wages for white companies. They are quite skillful gravel miners, and seem to be able to make sat-

isfactory wages on ground which white men will not touch. In some camps no Chinese are allowed to mine, while in others they are numerous. Many of them work over the tailings of drift mines on royalty or by purchase—work which white men do not appear to be willing to undertake.

In Amador County the prevailing rate of miners' wages is \$2.50 per day. In Butte County most of the miners get \$2.50 per day, but in some cases the men are paid \$1.75, \$2, \$2.75, and \$3; in others, \$2 per day and board, or \$52 per month. From Calaveras County returns come of \$2.25, \$2.50, \$2.62½, \$2.70, and \$3, though the average is about \$2.50 per day. In Del Norte County most of the men work their own claims. In Eldorado County the general rate is, miners, \$2.50 to \$3; laborers, \$2; timbermen and power-drill men, \$2, and foremen, \$4. In some gravel claims \$1.50 per day, or \$40 per month and board, are paid. In Fresno County men get from \$1.50 to \$2 and \$2.50 per day. In Humboldt County, at the beach mines, the men get at the ocean beach sand mines \$1.20 to \$1.50 and \$1.75, and \$30, \$40, or \$50 per month. In Inyo County miners' wages average \$3 per day, though in some places they pay \$70 per month. In the larger camps in Kern County wages are \$3 per day, though in some places \$2, \$2.50, and \$2.75 are paid, and \$40 per month and board. The largest mine in the county, with 150 men at work, pays an average of \$3.02 per day for the whole mining and milling force. In Lassen County the wages are uniformly \$2.50 per day. In Los Angeles County the wages are \$2.50, or \$2 per day and board. In Madera County the rate is generally \$2.50, but in some cases \$2, and in a few \$3 per day. In Mariposa County and the larger quartz camps of Coulterville and Mariposa miners are paid \$3 and surface men \$2.50 per day. At smaller camps men get \$2, or \$50 per month. Mono County pays the highest miners' wages in the State, viz, \$4 per day, and outside or surface men get \$3.

In Nevada County, at the large districts of Grass Valley and Nevada City, miners' wages are \$3 per day, and this rate prevails at most of the quartz mines. In the gravel-mining camps the rate varies from \$2, \$2.50, to \$2.75 per day. In this county there are 1,834 miners employed. In Placer County the average rate for miners is \$2.50 per day, though in some places \$2.75 is paid for miners, \$3 for machine men (drillers), \$2.50 for "muckers," and \$3 for engineers. In some placer camps men get \$2.25 per day, and Chinese get smaller wages. Plumas County seems to have quite a variable rate. In some places they get \$1.50, \$1.75, or \$2 and board, mainly to Chinese; and in others \$2.25, \$2.50, and up to \$3 per day.

In one or two camps the men get \$40 per month and board. Riverside County pays \$2.50 to \$3 per day, and Sacramento County. \$2 to \$2.50. San Bernardino County pays an average rate of \$3 per day and San Diego \$2.50. In Shasta County the average is about \$2.50 per day, though in some camps the rate is \$2 and board, or \$50 per month. There are more miners in this county than in any other in the State, viz, 1,875. The Mountain Copper mine employs the largest number of men of any single mine in California, and the men are paid daily wages according to the class of work they perform around the mine, smelters, and railroad. In Sierra County the average is about \$3 per day, though the many Chinese get less. In one large quartz mine in this county the miners get \$3 per day, trammers \$2.50, mill men \$3.50, and amalgamators \$4; foremen \$3.50 to \$5.

Siskiyou County has large numbers of Chinese at work as well as many white men. The rate varies greatly, viz, \$1.50 per day and board, \$1.75 and board, \$1.80 and \$1.90 and board, and \$2 and board, \$40 and \$45 a month and board, and \$2.25 and \$2.50 a day. In some mines they pay white men \$40 per month and board and Chinese \$40 per month without board. In Stanislaus County most of the men work on their own account. In Trinity, as in Siskiyou County, there is quite a varying rate, and many Chinese are employed. In some camps Chinese get \$1.50 per day, or \$30 per month; and white, \$45 per month and board. In others men get \$50 per month and board. The general white miners' rate is \$2.25 to \$2.50 per day, though in many cases less wages are paid, as is common where many Chinese miners are at work. In Tulare County the rate runs from \$2 to \$2.50 per day. In Tuolumne County the wages run from \$2.50 to \$2.75, \$2.90, and \$3 per day. The average may be said to be \$2.75. At the placers in Ventura, \$2, \$2.25, and \$2.50 per day, and in some cases \$40 per month.

The annexed table shows, by counties, the number of men employed in the gold and silver mines of California in 1899. It also includes the men in the copper and lead mines which produced any gold and silver. The total number employed is 18,701, which is a decrease of 1,122 from the number in 1898. The table is made from figures of returns on blanks sent from the United States mint at San Francisco to producers, and also answers from postmasters, express agents, gold-dust buyers, and others in the numerous camps, in the different counties.

The dry season accounts for the decreased number of men employed, since, as stated in the commencement of this chapter, numbers of mines ran only part of the time, and in some cases for a very short period, owing to the prevailing drought and resultant lack of water for power in gold washing.

MINERS EMPLOYED IN CALIFORNIA, 1899.

Counties.	Number of men.	Counties.	Number of men.
Amador	1,394	Riverside	200
Butte	782	Sacramento	130
Calaveras	1,005	San Bernardino	389
Del Norte	30	San Diego	525
Eldorado	801	Shasta	1,875
Fresno	158	Sierra	608
Humboldt	76	Siskiyou	1,578
Inyo	207	Stanislaus	15
Kern	983	Trinity	1,059
Lassen	53	Tulare	62
Los Angeles	66	Tuolumne	1,520
Madera	169	Ventura	8
Mariposa	561	Yuba	288
Mono	268		
Nevada	1,834	Total	18,701
Placer	1,411	Decrease for 1899	1,122
Plumas	646		

DISTRIBUTION OF THE GOLD AND SILVER PRODUCT OF CALIFORNIA FOR THE CALENDAR YEAR 1899 AS TO SOURCES OF PRODUCTION.

Gold:	Fine ounces.
Quartz	570, 197. 962
Placer	171, 682. 535
Silver:	
Quartz	387, 613. 03
Lead ores	109, 732. 07
Copper ores	356, 975. 69

The entire mineral product of California for 1899, including all mineral substances and their value, is shown in the following table, from Bulletin No. 17, of the California State mining bureau.

MINERAL PRODUCT OF CALIFORNIA FOR 1899.

Descriptions.	Quantity.	Value.
Antimony tons..	75	\$13,500.00
Asbestos.....do..	30	750.00
Asphalt.....do..	15,060	308,130.00
Bituminous rock.....do..	40,321	116,097.00
Borax.....do..	20,357	1,139,882.00
Cement.....barrels..	60,000	180,000.00
Clay:		
Brick.....M..	125,950	754,730.00
Pottery.....tons..	40,600	42,700.00
Coal.....do..	160,941	420,109.00
Copper.....pounds..	23,915,486	3,990,534.00
Fullers earth.....tons..	620	12,400.00
Gold.....do..		15,336,031.00
Granite.....cubic feet..	128,924	141,070.00
Gypsum.....tons..	3,663	14,950.00
Lead.....pounds..	721,000	30,642.00
Lime.....barrels..	299,854	314,575.00
Limestone.....tons..	30,769	29,185.00
Lithia mica.....do..	124	4,600.00
Macadam.....do..	323,590	239,867.00
Magnesite.....do..	1,280	18,480.00
Manganese.....do..	295	3,165.00
Marble.....cubic feet..	9,682	10,550.00
Mineral paint.....tons..	1,704	20,294.00
Mineral waters.....gallons..	1,338,537	406,691.00
Natural gas.....cubic feet..	115,110,000	95,000.00
Paving blocks.....M..	305	7,861.00
Petroleum.....barrels..	2,677,875	2,660,793.00
Platinum.....ounces..	300	1,800.00
Pyrites.....tons..	5,400	28,620.00
Quicksilver.....flasks..	29,454	1,405,045.00
Rubble.....tons..	641,308	547,025.00
Salt.....do..	82,654	149,588.00
Sand:		
Glass.....do..	2,000	2,000.00
Quartz.....do..	1,000	1,500.00
Sandstone.....cubic feet..	56,264	103,384.00
Serpentine.....do..	500	2,000.00
Silver.....do..		504,012.00
Slate.....squares..	810	5,900.00
Soda.....tons..	10,000	250,000.00
Total.....		29,313,460.00

IV.

COLORADO.

By JAMES L. HODGES,

Assayer in Charge, United States Mint, Denver, Colo.

Colorado's product for the calendar year 1899 was valued as follows:

Gold (at \$20.67 per fine ounce)	\$26, 265, 487
Silver (coining value, \$1.29 per ounce)	29, 679, 706
Lead (at \$0.447 per pound)	6, 051, 156
Copper (at \$0.1761 per pound)	1, 975, 518
Total	63, 971, 867

CRIPPLE CREEK DISTRICT (TELLER COUNTY).

In recognition of the vast mining and mercantile progress of the Cripple Creek district, the last session of the Colorado legislature conferred upon it the distinction of separation from El Paso County, whose county seat is Colorado Springs, and formed it into a county per se—Teller County. The city of Cripple Creek has since been voted the seat of government of the new county, and steps have been taken looking to the speedy erection of official buildings in keeping with the metropolitan tendencies of this wonderful camp.

But nine years old, this district has fairly won its new familiar designation of "the greatest gold camp on earth." Its early history was associated with incredulity on the part of experienced operators, indifference, or, at least, astonishing incapacity, of established railway lines, which tardily realized the possibilities of the section and withheld proper transit facilities until the ore uncovered, remarkable in extent and value, called for hasty construction of connecting lines to handle the output and individual traffic and lay down machinery, fuel, and food supplies suddenly demanded in wholesale quantities. Until such construction the freight rates were all but prohibitive of profitable mining.

RAILWAY FACILITIES.

At the present time the district is reached by the Midland Terminal Railroad, connecting with the Midland proper at Divide, and by the Florence and Cripple Creek Railroad, which strikes the main line of the Denver and Rio Grande at Florence, 40 miles distant.

A spur has just been completed from Cañon City to a point about 7 miles north of Florence to the line for Cripple Creek, and another corporation has surveyed for a 40-mile line from Cañon City to Cripple Creek.

The Florence and Cripple Creek will at once build ample railway shops, station, etc., at Cañon City; also a comprehensive reduction plant is projected at that point.

The Colorado Springs and Cripple Creek Railroad is actively grading and will be in operation by the autumn of 1900. The road will be 28 miles in length, skirt Pikes Peak and enter the camp by way of the new town of Cameron, to which point steam will be employed for motive power, and electricity from Cameron to Cripple Creek. It is expected that one and a half hours will be the schedule time from Colorado Springs. This road will also operate branch lines throughout the camp, similar to the Golden Circle, and electric-car enterprises which now wind picturesquely among the hills, bringing the scores of properties in this 6 square miles of territory in easy accessibility.

The Colorado and Southern Railroad has surveyed and expects to speedily build a cut-off from its South Park line in Platte Canyon to Cripple Creek, which will materially reduce the distance and running time from Denver to the district.

With the completion of these railway lines, the constant disturbing element of car shortages will be removed and prompt hauling guaranteed the camp's enormous tonnage at more liberal rates.

BENEFICIAL CONFLAGRATIONS.

In 1896 the town of Cripple Creek was severely devastated by fire, but has been more permanently rebuilt, and Bennett avenue, the principal thoroughfare, now boasts a large number of substantial blocks, which are veritable hives of industry in the diversified lines of mining, hotel, banking, and general mercantile pursuits.

In August, 1899, Victor, the eastern terminal of the district, a worthy rival of Cripple Creek, surrounded by the largest and richest properties, was entirely wasted by a conflagration, so far as its business center was concerned. It has, indeed, arisen, Phoenix-like, from its ashes, and handsome brick structures, reflecting architectural care and interior furnishings of no mean order, have supplanted the flame-inviting tenements, reared in haste, of first discoveries.

The Cripple Creek district is unique as a mining capital from the fact that it may be reached in a Pullman palace car, very elaborate hotel accommodations enjoyed, social clubs, handsomely housed, found, and churches, schools, and hospital privileges of modern pretensions invoked at will.

THE YEAR 1899.

During 1899 the producing area of the district was extended by discoveries of good mineral, until now it is bounded on the north by Copper and Rhyolite mountains, on the east by the school section east of Grassy, and on the south by Big Bull Mountain.

The Copper Mountain section has become the scene of active operations, and earnest work has been prosecuted by the Lost Lillie, Estella, Fluorine, Nickel Plate, and other companies. The great dikes traversing this northern territory argue well for profitable mining, although it is uniformly conceded that the mineral of best grade will be found only by deep shafts or tunnels, entering below the troublesome caps generally proven to exist.

Claims upon Ironclad Hill, comparatively neglected heretofore, are now held at very high figures, and active work is in progress.

Beyond, on Tenderfoot Hill, enthusiasm has found sufficient stimulus in the success of the Hoosier, which property is shipping good values in large quantity.

Much new work has been done on Raven Hill, while what was long supposed to be a barren side of Gold Hill and Mineral Hill are being assiduously exploited.

It is interesting to note that a fear so long felt and expressed of a disappearance of ore when shafts should encounter the granite underlying the breccia has been proven wholly groundless, excellent mineral bodies having been discovered underlying this granite. The deepest shafts, such as the John A. Logan (1,250 feet), have been in continuous ore.

THE SMELTER STRIKE.

In common with the other camps of the State, Cripple Creek was to a considerable degree affected injuriously by the shut down of the State's smelters for over two months in the summer of 1899, due to differences with their employees regarding the eight-hour law passed by the Colorado legislature, which act was later declared unconstitutional by the supreme court. Many mines, however, did not suspend until their ore bins were overtaxed, and mills having contracts with mines found it necessary to receive a higher grade of product than desirable.

When this industrial contention found adjustment, a congested condition at mining centers challenged the best efforts of the railroads, and weeks passed before the car shortage was corrected and normal hauls reestablished. Cripple Creek was a sufferer meantime.

SALE OF INDEPENDENCE.

The sale of the famous Independence mine on Battle Mountain, by W. S. Stratton, to an English syndicate was rapidly followed by other considerable investments of foreign capital in this camp. In some instances the entire capitalization being taken up, and in others controlling interests.

The business of the stock exchanges at Colorado Springs and Cripple Creek, and to a less degree that at Denver, also noted a material revival.

REDUCTION PLANTS.

The cyanide and chlorination plants treated during the year about 70 per cent of the camp's tonnage, which netted 45 per cent of the year's valuation, while the smelters cared for about 30 per cent of tonnage, yielding 55 per cent of valuation. The average value of the ore output was \$45. About 550 men were employed in the reduction works, while the underground miners of the district probably numbered 5,000.

The year's record of the reduction plants follows:

	Quantity.	Value.
	<i>Tons.</i>	
Metallic Extraction Co., at Cyanide (cyanide process).....	101,911	\$2,248,950
Colorado-Philadelphia Reduction Co., at Colorado City (chlorination).....	92,280	3,244,772
El Paso Reduction Co., at Florence (chlorination)	42,000	1,177,000
National Gold Extraction Co., at Florence (chlorination)	10,000	300,000
Colorado Ore Reduction Works, Elkton (cyanide).....	21,900	557,000
Gillett Reduction Co., at Gillett (chlorination).....	11,600	356,300
Brodie Gold Reduction Works, at Mound City (cyanide)	7,000	200,000

The National, Gillett, and Brodie Works were in operation only a small portion of the year.

NEW MILLS.

The year has witnessed the erection of three new mills—the Economic, Oneida, and Detroit—which are just passing through the experimental stage, and promise to play an important part in the milling features of 1900. The Oneida and Detroit have been testing novel processes thought to be adapted to low grades.

The Economic Gold Extraction Company mill in Eclipse Gulch employs the chlorination process, and is the largest plant of this character in the world. It was erected primarily to treat the product of mines under the control of the Wood Investment Company, and can, if necessary, exercise daily capacity exceeding 500 tons, the reducing plan being on the following order:

The ore from the large bins is fed into a gyrating crusher of 1,000 tons capacity, which makes possible the crushing of ore to the mill's capacity in an eight-hour shift, accommodated to a 2-inch mesh. Grizzlies of $\frac{3}{4}$ -inch opening then afford passage to the ore of such size or finer. The large sized surmounts them into secondary crushers, whereby its reduction to a $\frac{3}{4}$ -inch mesh is effected. This prepared ore then ascends to the sampler on the top floor of the mill, thence goes to the dryer and on to distributing screens, here being sized for the two sets of finishing rolls. By these reduced to a proper pulp, it ascends to the pulp bins, and is thereafter automatically conveyed to the roasters, seven in number, of a separate daily capacity of 50 tons. After roasting it reaches the coolers and subsequently the pulp bins just above the chlorination barrels. After weighing on hopper scales it is ready for charging the chlorination tanks.

The solution traverses the several precipitation tanks to the filter press after leaving the chlorination tanks.

An important feature distinguishing this plant from the ordinary mill process is the arrangement of the pulp bins, roasters, and chlorination barrels in units, with a capacity of 50 tons each per day, which will permit, if necessary, the treatment of seven classes of ore at once without a clean-up.

Another large reduction plant at Florence will be erected before the summer of 1900, and, with the completion of the Colorado and Cripple Creek road, plans for two big chemical establishments at Colorado City will be put into effect.

DIVIDENDS.

Within the limits of this article the individual performances of scores of notable shippers in the district can not find enumeration, but as an index of their merit it may be set down that 30 paid during the the year dividends of four and one-half millions, making a total of about \$12,000,000 received by stockholders since the birth of the camp.

LEADVILLE (LAKE COUNTY).

The Leadville district was never more active since the famous carbonate discoveries of 1878 than in the year 1899, especially during the latter half of the year. Well-known producers were worked to the limit, and an exceptionally large amount of exploration and new work was undertaken. Many drawbacks were, however, encountered.

The severity of the weather from January to April, 1899, seriously crippled the camp's efforts. Snow slides were numerous, the drifts for months being of great depth, and blockades on the railroads, which largely defied the mammoth steam plows, were the order of these arctic days. Many railroad spurs to the mines were necessarily abandoned. Fuel was dangerously scarce and a food famine threatened.

The smelter shut down for two months pending settlement of the eight-hour law also militated seriously against the year's production.

After the termination of the trouble in the courts a vexing car shortage ensued, and weeks elapsed ere the accumulated ore product was given car accommodation.

DOWNTOWN MINES UNWATERED.

The stupendous task of unwatering the Leadville basin or Downtown mines was completed in May by the Home Mining Company. This company was capitalized at 50,000 shares, par value \$1. It successfully drained these properties, cleared away the drifts, and speedily discovered high-grade chloride iron and lead bodies. Shipments were made on a large scale from the Penrose, Bon Air, and Starr shafts, the Penrose being especially prominent in the output of silver chlorides.

The Home stock rapidly advanced to \$20 a share, with little changing hands. The working plans of this company for 1900 are on an extensive scale.

The result of this pumping victory was the resumption of work by the Wolf Tone, Weldon, Bohn, Northern, Midas, Colonnade, and Sixth street properties.

A disastrous cave-in at the Bon Air was an exciting and pathetic incident of the year, the imprisoned miners being liberated only after long and strenuous labor and the mine cleared.

The possibility of a tunnel from Malta, 5 miles from Leadville and at the foot of the slope which it crowns, to tap the district's large mines at great depth, is actively discussed and promises realization at an early day. This would permanently solve the ever-present water problem, save heavy pumping costs, and permit the ores to reach railway by an exclusively downhill haul.

The building of additional spurs by the Denver and Rio Grande and Colorado and Southern railroads to the important locations has rendered the entire district readily accessible, and makes possible the shipment of low-grade silver-lead and gold ores in great quantity.

An electric railway to reach the Evergreen lakes has been planned.

Four smelters are now local to the district, a new pyritic plant, the Boston Gold-Copper Smelting Company, having reenforced the Arkansas Valley, Union, and Bimetallic.

BISMUTH AND ZINC ORES.

Valuable bismuth ore is shipped to England by the Ballard mine, carrying rich value in gold.

The zinc ores of the district have largely found a market in Belgium.

The manganese comes in greatest quantity from Carbonate hill, and Chicago is the depot of their shipment, its prominent producers being the Catalpa, Crescent, Seneca, Garden City, and Lost Chip.

Much leasing is incident to Fryer Hill. Iron predominates the ore formation, but lead and silver are also carried. Fryer's main exponents

are the Robert E. Lee, Augusta, Matchless, Gambetta, Niles, Chrysolite, Dunkin, and Cady.

In the Graham Park sulphide belt the Maid of Erin, Wolf Tone, and Adams have prepared to attain great depth.

The A. Y. and Minnie and Rubie and Moyer produced largely, and the Mike and Starr marketed fine bodies of iron sulphides.

THE GOLD DISTRICT.

On Breece Hill the Penn shafts, Ballard, Fanny Rawlings, St. Louis Tunnel, Little Vinnie, and Fraction were heavy shippers.

The Ibex group employs over 400 men and boasts nearly 60 miles of workings. The tonnage is about 60 per cent sulphide and 40 oxide, gold bearing, and was very large throughout the year.

The Triumph and Modoc are active in this neighborhood.

The Resurrection ore bodies have been continuously large and of fair grade. Extensive improvements on this property promise great results for its extensive acreage.

The old Lillian, in Iowa Gulch, continues its output.

On Little Ella Hill the New Year and Little Ella produced steadily. Large bodies of sulphides were uncovered by the New Monarch.

The Penfield and Fortune were new shippers, and the Reindeer to a degree.

The Dolly B. found good ore throughout the year, and the company is sinking a large shaft on the Board of Trade group.

THE YAK TUNNEL.

The Yak Mining and Milling Company is pushing its great bore from California Gulch to the Breece Hill gold section, and it has reached a length of 8,000 feet.

On Iron Hill the Iron Silver Mining Company was a big shipper, working through its Meyer shaft. Iron sulphides have predominated in the shipments, but Wilfley concentrating tables are now handling the lead-zinc portion of the ores.

The Mikado and Humboldt properties on the North Iron Hill have done considerable work.

The Revenue Mining and Leasing Company is sinking two important shafts south of Leadville in an effort to disclose the old Iron Mine shaft.

Exploration of a wholesale nature is being done by the M. A. W. and California Gulch Company.

Twelve new shafts will be sunk in the district early in 1900, and unless unforeseen handicaps appear this year's output of the Leadville mines will be far and away the largest in its history.

OURAY COUNTY.

The county of Ouray is practically divided into five mining districts, known as the Red Mountain, Uncompahgre, Sneffles, Camp Paquin, and Sentinel.

Red Mountain district has been gradually producing less, and in 1899 probably has shown the smallest production in its history.

This is because the great mines here are nearly all owned by foreign syndicates, who prefer to allow the immense ore reserves to lie idle until the price of silver materially advances. Some leasing has been done

on the dumps of the Guston, Yankee Girl, Silver Bell, and Genesee Vandebuilt lodes with general success. The great altitude, long winters, and heavy snowfall make transportation very expensive. Similar conditions obtain in the Uncompahgre district, its largest mines being silver producers.

MOUNT SNEFFLES DISTRICT.

Mount Sneffles of all districts has been most actively worked during the past year. Its greatest producer is the Virginus, a steady shipper of some twenty-three years. The mine is worked through the Revenue Tunnel, owned by this company. It cuts the vein 2 miles from the mouth and at 1,400 feet. The vein is persistent throughout, and while not always very high in grade is of a good concentrating quality. A very good gold value is associated with the silver of the Virginus ore. Electricity is the motive power in the mine, mill, and tunnel, generated at three power houses. Two electric engines convey the ore cars through the long tunnel and transport the miners to and from their work, while an electric hoisting plant is used at the deep shaft.

THE CAMP BIRD GROUP.

The phenomenal property of this district is the now famous Camp Bird group. This property has developed into a veritable bonanza, the value of the ore being almost entirely gold, often very rich, and in such cases sent directly to the smelter.

The vein of the Camp Bird Mine, the principal one in the group of 33 claims, is favorably located for the economical working of the output at the head of Imogene Basin, upon the main divide between Ouray and San Miguel counties, in such a manner that it can be operated through adit levels from the surface. Two of these levels have been driven 2,500 feet each, and a third is started. The vein is continuous. The ore seems to be principally a sharply crystallized quartz in which the values are in the form of free gold, which amalgamate readily.

The erection of the mill, and especially the tramway connecting the mine and mill, was a marvel of speed, local conditions considered. The mill site is a beautiful one—at the junction of Imogene and Sneffles Creek, $5\frac{1}{2}$ miles above the town of Ouray. It has been named Potosi, after the mountain. The mill is modern in every sense, and has a capacity of 80 tons daily, the machine power being electricity derived from the Ames power station 17 miles distant. The mill has its initial crushing machinery—20 stamps, 850 pounds each, dropping 90 times a minute with a fall from 8 to 9 inches. No attempt is made to amalgamate in the battery, but each battery is supplied with an amalgamated copper plate 17 feet long, with copper traps at the end of each plate to catch any escaping mercury or amalgamate. From the plates the pulp passes through long launders provided with amalgamated copper plates that arrest any values escaping the plates and traps. This pulp is sized, the slimes being sent over five Frue vanners, and the coarser material elevated to Huntington mills, where the sand is reground and again passes over plates. These tailings are treated on five other vanners, the same as the original slime. Ninety-two per cent is claimed to be saved. The mill is connected with the mines by a wire tramway fully 2

miles in length, completed at the beginning of winter in just forty-nine days.

A large cross compound compressor of the Rand type, driven by electricity, furnishes air for the drills. Eighty men are employed at the mine, and 50 more at the mill and other work.

Several other properties in the Mount Sneffles district have proved themselves in the list of gold producers. The leasing system is becoming popular in this section of the county.

CAMP PAQUIN DISTRICT.

Camp Paquin district embraces a large number of producing properties, some of very high grade silver ore, carrying values which net as high as \$300 to the ton; but the most active work in this district is probably in the gold deposits which exist in the quartzite strata of the great sedimentary formation close to the town of Ouray. These mines maintain a constant output of excellent ore. A number of these claims are worked through a tunnel of 2,000 feet, run to crosscut the ore bodies supposed to exist in the contact. A lower quartzite formation has been carefully prospected, and values found as well as in the upper strata, but in the lower the arrangement of ore deposit seems to be very different, apparently being in fissures, or breaks, through the sedimentary rocks, and which do not seem to hold their values to the same extent with the depth that they do in the upper portions of the same veins or deposits.

The Sentinel district has not produced ore regularly during the past year.

SAN MIGUEL COUNTY.

In shipments of concentrates from the railroad stations in San Miguel County there was a loss of close to 20 per cent, caused by the smelter shut-down in the summer months and by the in-and-out operations of the smaller mines. To this may be added litigation, the sudden appearance of water in large quantities, and other incidents which attend mining in the most conservative camps.

In 1898 the Telluride shipments reached 17,908 tons, and thus far Ophir 6,850 tons. Saw Pit was credited with an output of \$75,000 at the mills and smelters.

As there was a gain of 10 per cent in the value of copper and 11 per cent in the value of lead, the county's credit for 1899 shows a loss of close to 15 per cent. In the table following the shipments by months from Telluride are given for each year in carload lots:

Months.	1898.	1899.	Months.	1898.	1899.
January	94	90	August	184	131
February	87	92	September	161	240
March	94	123	October	150	124
April	103	102	November	168	125
May	134	114	December	160	130
June	141	34			
July	152	5	Total for year	1,628	1,310

At 11 tons to the car, the average figure, it will be seen that Telluride shipped 14,410 tons in 1899, compared with 17,908 in the year

previous. At Ophir the Carribeau, Shoemaker, and Butterfly were closed part of the summer, hence the shipments from that camp fell from 6,850 tons in 1898 to 5,480 in 1899.

THE HEAVY SHIPPERS.

San Miguel's large and steady producers, which cover 20 miles of side track with loaded cars during the summer months, took no part in the eight-hour discussion. The new and shorter work day was conceded to the men on reasonable terms, and mining and development proceeded as usual with the exception of the troublesome ore blockade, which was broken in August, but not entirely relieved until the end of September. The latter was the banner month for Telluride shipments, showing the outward movements of 240 cars of concentrates, equal to 2,640 tons. As has been the case for some years past, the Smuggler Union occupies first place as shipper. The year's output from this well-developed property again approximated \$1,000,000 in value. Early in May the Smuggler Union property was sold by its Denver and China owners to the New England Exploration Company, made up of Boston men, on an estimated basis of \$2,000,000. A crushing plant was installed at the plant so that the ore is now crushed before being trammed to the reduction plant. The latter during the summer months was doubled in size, which means a largely increased output for 1900. The present plant is modern in all its appointments, and is equal to 400 tons per day, making it one of the largest in the State.

In the way of levels, cross-cuts, tunnels, etc., there are some 30 miles of underground workings in the Smuggler Union group. The deep levels are some 2,000 feet from the surface and following the principal ore vein a distance of 8,500 feet. Metallic gold in pockets was a feature in 1898, but these were not encountered in 1899.

From the treatment plant at Pandora nothing but concentrates are shipped, the latter representing 5 or 10 tons crude material and 1 ton of concentrates, worth \$60 to \$75 per ton in gold and silver with no lead.

The company is exploiting the Contention group with a view to purchase. It is located up Bear Creek, the ore yielding \$15 to \$20 per ton in gold from extra wide veins.

LONDON AND COLORADO.

The second shipper on San Miguel's list is the famous Tom Boy, a free-gold proposition, which was placed in London in December, 1896, at a valuation of \$2,000,000.

In June a London company, known as the Tom Boy Gold Mines, was incorporated and took the property. It has been responsible for the management since September.

In his stated report, Manager Herron places the output at \$13,000 to \$15,000 per week, with development proceeding rapidly from the 300-foot, 500-foot, and 700-foot levels. The main shaft, now over 800 feet in depth, is being sunk still further. In November levels were extended to the right and left, and the richest ore thus far disclosed was cut, proving the strength and permanency of the Tom Boy vein, which gives employment to 225 men, supplies a 200-ton treatment plant with ore, and gives satisfaction to its English and American owners.

JAPAN MIKADO GROUP.

The property under this title has its chief office in Denver and became prominent in 1897, when it produced \$112,500 in silver, \$87,500 in gold, and \$50,000 in lead. In 1898 it showed a gain of 25 per cent, running the total for the year up to \$312,500. The property includes nine patented claims on the extension of the Tom Boy vein and near it, and also the Park placers north of the Japan property. The output for 1899 was stated as \$420,000. There is a concentrating plant attached. Development work is steadily pushed, as a large portion of the company's territory has not been exploited.

The Liberty Bell Mining Company is among the comers. It commenced extensive development last spring, and has a large area of milling ore blocked out ready for the treatment plant it proposes to erect early this year. The capacity will equal 200 to 300 tons per day, which the mine can easily supply. The values are gold, silver, and lead, the ore in the large veins running from \$15 to \$20 per ton, easily extracted by pan amalgamation and cyanide, the latter for the mill tailings.

The Liberty Bell owns half a dozen claims in San Miguel and as many more on the Ouray side. The company is a subdivision of the United States and British American Exploration Company.

In 1898 the Nellie and Ella group, on Bear Creek, produced gold at the rate of \$30,000 per month, but litigation over the territory caused the mine to stop shipping early last spring, and cut its output for the year by 50 per cent.

In Mount Wilson district the Silver Park is prominent. It paid nothing last year because of labor and other troubles of an unexpected nature. The property is owned in Connecticut, and includes 13 claims. Concentrates produced at the company's mill are worth \$200 per ton. The mine was closed during the eight-hour discussion. When this was arranged, water was met near the surface in stoping out the ore. This caused another delay, the year showing a loss of 50 per cent in output. The concentrates show 90 per cent gold and 10 per cent copper and silver. As the ore is of the arsenical-iron class, it is not easily treated. The mine is 13,000 feet above sea level.

SALES AT OPHIR.

During the second week of November last the Carribeau and Klondike properties, both in Ophir district, changed hands. In the case of the Carribeau, the Venture Corporation, Limited, of London, were the purchasers. For years the Carribeau has been the chief producer of the camp, affording employment to about 100 miners. It carries copper and silver-lead ores. There is a milling plant of 20 stamps attached. The net value of 386 samples was \$20.75 per ton. The new owners will increase the concentration plant to 50 rapid-drop stamps, which will be ready for the ore by the 1st of May.

An Eastern syndicate took the Klondike, the new company to be hailed as the "New Klondike Gold Mines Company." This property was located in 1898, but the development shows a large number of veins, yielding \$10 per ton in gold, near the surface. A treatment plant, including cyanide, is projected.

MILLS OF SAN MIGUEL.

With a number of plants under way, in addition to the list below, it will be noted that San Miguel County is well provided with modern mills. The following are in operation:

Name.	Tons per day.	Name.	Tons per day.
Smuggler Union	400	Allegheny.....	50
Power Company's Plant	250	San Bernardo.....	50
Liberty Bell	240	Silver Pick	45
Bessie Cyanide.....	200	Turkey Creek.....	40
Tom Boy.....	200	Illum	25
Japan Concentration	100	Butterfield.....	20
Gold King	80	Euclid Avenue	20
Suffolk.....	80	Carribeau	20
Hector.....	75	Little Mary.....	20
Butterfly.....	60		
Columbia-Nenona	60	Total tons per day.....	2,035

This shows a gain of 575 tons capacity per day over 1898, which will be increased largely. The use of electricity as motive power and its transmission long distances by wire are features of mining and milling in San Miguel. The Telluride Power Transmission Company maintains one of the largest mills in the country. The plant dates back to 1890, and has recently extended its wires to the Camp Bird group, in Ouray County. It is managed by Mr. Nunn, a well-known engineer. The plant's location is at the junction of two forks of the San Miguel River, 12 miles from Telluride. The waters of Howards Fork and Trout Lake are aided by a flume of 4,400 feet in length, with a head of 525 feet. The Trout Lake Reservoir covers 160 acres. The power is carried 13½ miles to the Tom Boy mill, and it furnished light to the residences and business houses in Ophir and Telluride.

SATISFACTORY OUTLOOK.

Mine managers, mill men, and others well acquainted with conditions in San Miguel unite in declaring the outlook for 1900 extremely bright. New treatment plants are taking the place of old ones, and strong companies have stepped in.

In Middle Basin, the Montana group, with gold, silver, and lead as the values, is being exploited by the Virginus Company. The ore vein has been cut at great depth by the Ophir tunnel at a point where the body is 25 feet in width. The new buildings at the mine were destroyed by fire last fall, but will be speedily replaced. The ore is treated at the Cimmaron mill, which will be increased to handle from 250 to 300 tons per day.

The Little Mary Mine, Marshall Basin, is owned by the Colorado Exploration Company. It crossed the Smuggler Union vein at right angles. The vein measures from 20 inches to 4 feet in width, and runs \$60 per ton at the mill. Arrangements for a tram from the mine to the Allegheny mill, a distance of 2 miles, are being made. The mill is under bond and lease to the company.

An experimental cyanide plant, equal to 200 tons per day, is being erected by St. Louis parties at the Smuggler Union dump. It will handle the tailings from the Smuggler Union plant, as well as material from the Gold Run placers.

SAN JUAN COUNTY.

San Juan County, of which Silverton is the central point devoted the summer months to development and assessment work, and to pushing the many tunnels with which the mines of the county are equipped owing to the steep mountains in which the mineral veins are located. The smelter shut-down caused an almost total cessation of shipments from June 15 to early in September, when the treatment plants were once more ready to handle the ores. At this time there was a shortage of miners in the big properties, as many of the men scattered to the other camps when the shut-down became effective. Between the two causes San Juan County shows a falling off in ore and concentrate shipments for the year equal to 16 per cent of the 1898 output. In the latter year 51,840 tons left the Silverton depot, consigned to the smelters in Durango and Pueblo. The closest estimate for 1899 shows 3,600 12-ton carloads, equal to 43,200 tons, most of it concentrates.

Owing to the gains in the price of lead and copper the money value of the San Juan shipments fell but 10 per cent as compared with 1898.

Toward the close of August the mine owners held a conference and adjusted all the difficulties which arose from the eight-hour effort. Every available mine and mill man that could be found was returned to work, and an effort was made to fill up the gaps caused by the summer migration. Since that good hour the movement of San Juan County has been forward, with fresh capital coming in, new mills being erected, and old properties restored to the shipping list; but it took some time for the smelters to clear the side tracks, and the middle of September was reached before the normal was restored in the item of daily shipments from the Silverton depot.

The Red Mountain Railroad, running from Silverton to Red Mountain, increased its carload shipments over 1898, the amount averaging 3 to 4 carloads per day in the fall and early winter until the deep snow put a stop to transportation over that line. The supply from this source and from the Eureka district accounts in large part for the prominence of gold and copper in San Juan's production.

GLADSTONE-SILVERTON RAILROAD.

A feature of the summer work was the inauguration and completion of the Gladstone, Silverton and Northern Railroad, running a distance of 9 miles from Silverton to the Gold King group of mines, near Gladstone. The enterprise was started in May and completed in July at a cost of \$75,000. The owners of the famous Gold King group, who reside in St. Johns, New Brunswick, are also the owners of the new railroad. It is now doing excellent work.

The San Juan property best known to the public is the Silver Lake group of 126 patented claims, well equipped with machinery, tramway, and buildings, and developed by extensive tunnels, levels, etc. There are 250 men on the pay rolls, and when the property is in full operation the value of the daily output is \$2,500. The sale of the Silver Lake group to Boston parties, on a basis of \$2,500,000, was reported in September last. The arrangement was not completed and the property remains in the hands of Mr. and Mrs. F. G. Stobier, who may be credited with as good a showing in mining development as any district can exhibit notwithstanding the fact that the property is snowed in for three months of the year, owing to its great elevation—12,000 feet above sea level.

The Silver Lake tramway, 14,700 feet in length, is one of the longest on the American continent. The concentrating mill, entirely modern, handles 250 tons of crude ore each day. A double-track tunnel, at 3,000 feet from the surface, connects the leading producers in the group. The Silver Lake concentrates have an average value of \$40 to \$50 per ton.

In the Iowa group the values produced are gold, silver, and lead. This property has a modern concentration mill of its own, and resumed the payment of monthly dividends December last. The gold values of the Iowa exceed the silver-lead values. The material is concentrated, 5 tons into 1, and then shipped to the smelters. The number of men employed will average 150.

The Sunnyside group, now equipped with a modern concentrating plant, equal to 100 tons per day, yields gold, silver, and lead, the wide veins on the group averaging from \$20 to \$50 per ton. In part of the group lead-zinc ore prevails, and this is also to be handled in a concentration plant after the system followed at Leadville and Creede.

GOLD KING GROUP.

The new mill at the Gold King group, recently completed, will handle 100 tons of crude ore each twenty-four hours. The company is steadily adding to its territory.

The American Mining and Tunneling Company, closely related to the Gold King owners, has undertaken to cut a large tunnel from the base of Bonita Mountain, which will reach the various Gold King veins at a depth of from 1,000 to 1,500 feet. This will very much cheapen the cost of mining, transportation, and drainage.

The Maggie Gulch gold ores yield \$150 and upward to the ton. The development up to this time has not been extensive.

Gold and lead are produced by the Pride of the West and other mines in Cunningham Gulch, while high-grade ore comes from Bear Creek during the summer months when trails are open.

The Empire Consolidated group, Sultan Mountain, on the edge of Silverton, will have a new 50-ton concentrator ready for work early in the year. There is a tunnel at present 900 feet in the mountain.

One of the veins cut in the Empire is 7 feet in width, with 1,000 feet of stoping ground up toward the surface. The values are silver, copper, and lead, averaging \$30 to the ton.

During the year shipments of tungsten ores were made from the Cement Creek district, by Theodore Rabowsky and others, which excited considerable attention at the time.

The Excelsior mine, Boulder Mountain, was producing 50 tons of lead-silver ores per week in the fall months, running 40 per cent lead.

From the Tiger mine, Arastra Basin, the shipments were 200 tons per month in the early fall and part of the winter. The crude ore runs 22 per cent lead, and a much larger output is predicted for 1900.

The tungsten ores are produced in the Bonita mine and also in the H. C. H. property at Gladstone.

The lower tunnel of the Silver Ledge mine cut 18 inches of ore early in November, which assays all the way from 100 to 200 ounces in silver and 30 to 40 per cent copper. The ledge is operated by the Occidental Company under bond and lease.

SAN JUAN'S NEW MILLS.

The Red and Bonita mill in the Gladstone section was started up early in November. It has a capacity of 75 tons per day, and is entirely modern in equipment, the cost ranging from \$35,000 to \$40,000. There are 13,000 feet of tunnels in the Bonita group.

Among the modern mills in the county are the following:

	Tons per day.
Silver Lake	250
Iowa	100
Gold King	100
Terry	100
Bonita	75
Boston and Silverton	75
Silver Ledge	50
Sunnyside	50
Silver Wing	40
Total daily tonnage	840

INDIVIDUAL OUTPUTS.

The Iowa Gold Mining and Milling Company shipped, in 1899, 9,547 tons of ore, largely concentrates, which contained 5,500 ounces of gold, 26,000 ounces of silver, and 5,500 tons of lead. This is the consolidation of the two companies—the Iowa and the Tiger.

The output of the Emma mine for the year 1899 was 96 tons of lead and 1,688 ounces of silver.

The Ridgeway, in Maggie Gulch, produced 150 tons of a pit-side ore, averaging about \$75, one-half silver, one-half gold.

A NEW SMELTER.

The new smelter at Silverton purposes to treat particularly sulphide ore and pyritic zinc. If successful, it will consume everything in the upper end of the Animas Valley.

MINERAL COUNTY (CREEDE).

There have been no new districts in this county opened up during the year, but a number of properties have resumed work and several new shippers added to the list.

The character of the ore throughout the district has not changed materially, with the exception of the ore found in the lower levels of the United Mines property. The oxidized surface ore has changed to that of the sulphide, carrying a large per cent of lead and increased value in gold, as well as considerable zinc.

The general average of the values has increased somewhat on account of improved methods in the way of handling and assorting the ore.

The Bachelor vein, upon which the principal producing mines of the district are situated, is noted for the large amount of water encountered in all of the mines, obliging a number of them to close down in the spring of 1894; but this has been thoroughly drained by the Nelson tunnel, which has been driven along the vein to a distance of over 8,000 feet, and has also made connections with The Last Chance, New

York, and Amethyst mines, and drained all these properties to a depth of about 1,600 feet from the surface.

All the properties of the district, with the exception of the Commodore mine, are being worked on the leasing system, royalties being about 30 per cent.

The Commodore mine is the principal producer of the district, and employs electric, steam, and water power, the balance of the properties using steam exclusively. The fuel generally employed is coal.

MINING FACILITIES EXCELLENT.

The mining facilities of the district are first class in every respect. The Commodore mine is one of the best equipped in the State. Its traction cable carries the ore direct to the railroad cars.

The Last Chance is equipped with a large double-compartment shaft, operated by two 100-horsepower hoisters, besides a 12-drill Ingersoll air compressor.

The United Mines has a double-compartment shaft with one 80-horsepower Fairbanks hoister and one 60-horsepower Hendrie & Bolthoff hoister, as well as a 16-drill Lyner air compressor. In connection with this property there is a mill erected by the Creede Cooperative Company, which has a lease upon the same above the seventh level. This mill has a capacity of 75 tons per day, and economically handles the ore. Automatic feeders are so arranged that it only requires one man on a shift to handle the entire product. The mill uses the improved Cazin rolls and Blake crusher for the preparation of the ore, which is then transferred to the Wilfley tables for the separation of the gold, silver, and lead values.

The Antlers Park Regent also boasts a first-class plant of hoisting machinery, as well as a 16-drill Lyner air compressor. The company also has a 10-stamp mill and two Frue vanners, but on account of the refractory character of the ore it has not been a success, and has been closed down four years.

There are no chemical plants in the district. The three mills in active operation are concentrating mills. The one referred to upon the United Mines and a 75-ton mill on the Creedmore property employ jigs and Wilfley tables for the separation of the lead and zinc. The other on the Solomon and Ethel properties, with a capacity of 60 tons per day, is equipped with the same class of machinery. These two properties are noted for their zinc product, which is consigned to the zinc smelters of Kansas, Missouri, and Illinois.

The closing down of the smelters during the summer caused a large falling off in the ore shipments, from which the camp did not fully recover until October.

The treatment charges range from \$10 per ton upon the highly silicious ores to nothing upon the high-grade lead ores.

The district is exceptionally favored in railway facilities, the longest haul being less than 3 miles.

Outside of the Creede Cooperative Company, Colorado capital controls all the mining enterprises of the district.

There has recently been a mining exchange organized.

PRODUCERS FOR 1899.

The producing mines for 1899 were as follows:

Name.	Tons	Silver.	Gold.	Lead.	Zinc.
		<i>Ounces.</i>	<i>Ounces.</i>	<i>Tons.</i>	<i>Tons.</i>
Amethyst mine.....	7,480	187,000	1,122	1,047	.....
Alpha mine	15	741.50	.....	.....	.....
Bachelor mine	5,264	236,899.40	157.93	105	.....
Commodore mine	60,081	2,880,000	1,500	27,000	.....
Creedmore properties	2,320	3,840	131	896	624
Corsair Mining Company	620	93,000	12.40	.....	.....
Champion.....	120	12,960	.....	.....	.....
Del Monte.....	22	660	.44	1	.....
Kentucky Belle.....	31	2,480	.....	.....	.....
Kreutzer Sonata.....	18	1,170	.....	.....	.....
Last Chance.....	16,000	768,000	1,600	1,280	.....
Mollie S.....	96	9,984	.....	.....	.....
Solomon and Ethel properties	2,600	7,020	342.50	1,092	650
United mines.....	8,303	53,969.50	2,075.75	1,660	.....
Total	102,970	4,257,724.40	6,942.02	33,081	1,274

The mines that have not produced but are in active operation at the present time are as follows: Nancy Hanks, Nelson Tunnel, Holy Moses, Oregon, Sunnyside, Development Company's properties, Colorado Maid, Creede, Quintette, Lotta and Matilda, Maben properties. All of these are being worked under the leasing system. The New York mine, which at one time was the largest shipper in the district, has been closed down for the last six years on account of litigation.

HINSDALE COUNTY.

Notwithstanding the severe winter, which offered obstacles to a large production during the first two or three months of 1899, and the troubles at the Smelters during the early summer months, the year has been a banner one in Hinsdale County. The new operations consist of carefully selected groups and large workings on a systematic plan. There are more big enterprises than at any other time, and many people have come here.

In Galena district the big shippers have been the Ute and Ulay, Hidden Treasure and Lellie. The first named of this trio has been for years the largest shipper of lead ore in southern Colorado. Located in the seventies it has had an exceptional career. Carrying 60 to 70 per cent lead and values of silver and gold, it has produced at the rate of \$600,000 per year. For two years it has been operated by the Auric Mining Company. There are about 70 men employed, and nearly all the ore is concentrated in the large 350-ton mill. Shipments have run about five cars a week.

The Lellie, owned by the Red Rover Company, of Boston, is a young mine with a splendid record. Two years ago a cross-cut tunnel was run to cut the vein of this group, and opened up a very mediocre amount and quality of ore. The ore shoot was encountered in drifting to the north, and for a distance of over 400 feet. It maintained its continuity, broken only for improvements, at times over 4 feet of solid lead and gray copper ore being in sight after shooting. This company shipped two cars a week of crude ore, which nets something like \$800 per car. A cross-cut tunnel will cut this vein about 800 feet below its present workings. On the completion of this work and the opening of enough ground to insure a large output, a concentrating plant will be erected.

Almost adjoining the Lellie is the Vermont group, consisting of the Scotia, Pearl, Alabama, Fairview, and Vermont. The only one of the five that has any development is the Vermont. Its immediate neighbor, the Ocean Wave and Wave of the Ocean, has yielded some very high-grade lead and silver ore. A compressor and air drills were installed and commenced running a large crosscut tunnel from just above Henson Creek to run this vein from the lowest possible point. The tunnel at the Vermont will be in about 1,500 feet before the vein will be cut, and at the present time is boring its way at a rate of five feet a day.

A mile beyond the Vermont, on Henson Creek, is the Czar group. This is the latest addition to the regular shippers, and has recently entered a night shift.

The Hidden Treasure, the largest producer in Galena district at this time, is the extension of the Ute. This is also one of the comparatively new shippers, and sends to the smelters about one car of concentrates per day. The mill is of 125-ton capacity and has a Bleichert tramway from the mine. There are about 75 men in the mine and mill.

THE GOLDEN FLEECE.

Lake mining district is the home of the Golden Fleece and other large mines. While the production here has not been up to the former years, the real good work has been of greater importance to the future of the camp and the mines than would a large and temporary production. The Fleece was discovered by the late Charles Davis; that is, the property, as a mine, was discovered by him, for in fact this claim was originally located in 1873 or 1874. The first half car of ore netted about \$19,000. In the following five years the sum of \$1,500,000 was taken out. Some two years ago there were on the dump and in the workings of the mine thousands of tons of low-grade ore, and the problem of getting the values from this low grade had to be solved and the mine worked on a more economical system.

This year has seen the fruition of this labor. A site was secured for the long crosscut tunnel near the level of Lake San Cristobal and a long bore of 3,000 feet, to gain a point immediately below the present lowest workings, was begun.

A series of tests with about 200 tons of the low-grade ore of the mine was made at different plants throughout the State, which proved that the ore could be treated at a profit. While the shipments recently have not been large they have been exceedingly good. About three cars a month have been sent out during the year.

Just beyond the Fleece tunnel is another of the workings, consisting of a crosscut tunnel which is being run to cut the Lake View vein, and which will be several thousand feet. Close by is the Contention, operated by the Megunticook Company, of Boston. The property has put in a compressor and tapped the vein much below the former level and since has been a regular shipper.

The Black Crook is another neighbor, as is the Hiwassee.

There are hundreds of smaller properties in this county.

LA PLATA COUNTY.

It is difficult to accurately estimate the value of the output of precious metals in La Plata County for the year 1899, which was the smallest for ten years. The largest companies for one reason or

another did not take out any ore. Some of them did not operate during this year. While the district enjoys as many natural advantages as any other, no other section has suffered more from what may be termed unnatural disadvantages. Until 1881 the section was far removed from railroad. Until 1890 mining and treatment charges were exceedingly high. Many serious blunders have been made in the selection of processes of mill treatment. The bromination process saved a high percentage of values but the operating charges were excessive. Amalgamation and concentration of the contact ores has been only successful in handling the oxidized iron ores. This kind of milling fell down on the heavy iron sulphides.

The cost of smelting now is comparatively reasonable, but only the tellurium ores possess sufficient value to warrant transportation and treatment, save the higher grade ores confined to channels or chutes in the contacts. The greater number of properties on the tellurium belt have been idle most of the time, owing to litigation, ownership by non-resident heirs, or some other cause than lack of good enough ore to make money by proper working.

THE MANCOS CONTACT AREA.

During the past two years the greater progress of exploration has been made on what is known as the Mancos contact area. These contacts are now known to have an area about 7 miles in width, extending from the Mancos River east to Deadwood Gulch, in the heart of the La Plata Mountains. Considerable development has been performed in the Mancos sections, but only work of a surface character has been done in Deadwood Gulch. The same general geological conditions prevail throughout the whole known area. The economic conditions, with reference to the occurrence of ore, are practically the same. Although very rich gold ores have been taken from the chutes and channels of these general contact planes, it is generally conceded by owners and operators that the whole product must be treated by some approved economical mill process which will save the greatest percentage of values at the least cost. The cyanide process's adaptability for the treatment of these ores is being studied. Amalgamation and concentration with cyanide will probably be employed.

Water encountered in sinking, as a rule, is considerably below the average. The flow of water in numerous streams, for power and general use, is far above the average.

The bond and leasing system has not grown to importance, chiefly because of extortionate royalties of the past. In the tellurium mines a basis could be fixed which would prove profitable for both owners and lessees.

ABUNDANT WATER POWER.

Only steam power has been employed in the district, although there is a world of water and water power to be used as initial power for electric force. There is but one hoisting plant in the entire district and only two or three pumps.

With mining more generally and thoroughly established, operators will be favored by an abundance of coal, timber, and water near at hand.

The transportation of coal in wagons and on pack animals has been very expensive, but branch mountain railways can be constructed at the nominal mountain expense.

There are four or five modern stamp mills in the district which can be remodeled and brought into earning use. The only chemical plant is the idle bromination mill. Chlorination has not been employed.

A small demonstrative cyanide mill was operated quite successfully on Junction Creek tellurium ores about eight years ago, but the treatment charge was \$18 per ton, and there was not much ore to play to such prices. Thus, the cyanide mill closed itself down and waited for the floods to undermine and destroy the building and machinery.

The smelter strike did not affect the La Plata district, as there was not much effort at that time to take out and ship ore.

Greater mining in the La Plata country will be brought about by more comprehensive milling. The matter of treatment is the chief problem now, and its requirement is second in importance only to the great need of intelligent capital for mining development. The district is 500 miles by rail from Denver, the world's mining headquarters, and this fact has militated sorely against the section.

This district needs branches of the local railroad. A broad-gauge line to the South might somewhat cheapen living commodities, and this, of course, would be advantageous to the mining as well as to the several other industries.

Only in two instances has there been any considerable amount of outside capital invested in the district. In one, the money was unwisely expended in development and partially so in the purchase. In the other case much impracticable work was done, but there are very encouraging results.

THE DURANGO SMELTER.

The Durango smelter handles the ore from Silverton, Rico, Telluride, Ouray, and in fact from all the mines in the country. The average value of the ore smelted during the year was about \$25.

There has been no introduction of new processes.

GILPIN COUNTY.

This is the smallest county in the State and the home of the first lode mines. It has shown a steady increase for the last year in gold and silver. Although no new territory has been opened up, much development has been done in nearly all camps in the district.

The predominating character of ores is unchanged. Old mines have been reopened and worked with great success by a system of pooling, which is in vogue here. When stock companies fail, miners take the concerns, issue no stock, and work on the cooperative plan.

Russell Gulch, Nevadaville, Perigo, Pine district, Gregory, and Gilpin show much activity, with good prospects for the coming year.

The general value of the ores runs about the same as in 1898.

There was a slight increase in tonnage during the year.

The smelter strike had but little if any effect on the district, the local mills buying all ores offered until storage capacity was overtaxed, about which time troubles ceased and shipments were resumed to the smelters at Denver and Pueblo. It is the general opinion of the old and practical miners that with the improved methods of handling low-grade ores the output for the next year will surpass that of 1899.

There is no trouble experienced with water, owing to the great number of tunnels; in fact, water is a scarce article. The fuel supply is adequate. The milling capacity is ample.

The Gilpin County Electric and Power Company is building a large addition to its plant.

A new concentration mill is being erected at Nugget placer of 250 tons capacity; also one at Black Hawk, concentration and amalgamation, of 300 tons capacity.

The Avon Mining and Milling Company is about to erect an electric plant and concentration mill of 200 tons capacity.

Water rights are so generally appropriated that with the addition of their new plant and the increase of the Gilpin County plant, mills now being run by water and steam will change to electricity, thus relieving the great demand for water.

A large percentage of the mills have changed from slow to rapid drop stamps.

There are about 2,500 men steadily employed in the district.

The Colorado and Southern Railway terminates at Central City and affords ample means of transportation for all ores and fuel.

Following is a list of the mills in operation during the year:

Mills.	Location.	Character.	Daily capacity.
			<i>Tons.</i>
Rocky Mountain	Black Hawk.....	Rolls and Huntington.....	75
Vendome.....	Nevadaville.....	Amalgamation and concentration, 30 stamps...	60
Perigo.....	Perigo.....	do.....	100
Polar Star.....	Black Hawk.....	Amalgamation and concentration, 40 stamps...	60
Randolph.....	do.....	Amalgamation and concentration, 50 stamps...	75
Climax.....	do.....	Amalgamation and concentration, 25 stamps...	37
Hidden Treasure.....	do.....	Amalgamation and concentration, 85 stamps...	115
Gilpin County.....	do.....	Amalgamation and concentration, 75 stamps...	75
Eagle.....	do.....	Amalgamation and concentration, 35 stamps...	70
New York.....	do.....	Amalgamation and concentration, 75 stamps...	115
Pennsylvania.....	do.....	do.....	75
Bobtail.....	do.....	do.....	115
Iron City.....	do.....	Amalgamation and concentration, 25 stamps...	50
Mead.....	do.....	Amalgamation and concentration, 40 stamps...	60
St. Louis.....	Gilpin Gulch.....	do.....	25
Rollins.....	Perigo.....	Amalgamation and concentration, 25 stamps...	25
Wide Awake.....	do.....	Amalgamation and concentration, 15 stamps...	15
Gunnell.....	Upper.....	do.....	30

CLEAR CREEK COUNTY.

For the past year the condition in this county has been most favorable, although no new territory has been opened up. Operations have commenced on quite a number of old properties to gain depth. No change has been noticed in the general character of the ore. The general average of the output shows a slight increase for the year. The mines are troubled very little with water, tunnels easily draining them.

The bond and leasing system is general. The smelter strike of last summer had no material effect, the local mills buying all ores offered.

A large addition is projected for the electric plant in Georgetown to supply power to mines and mills. The milling facilities are ample.

There has been a new concentration plant built in Silver Plume, capacity 50 tons a day, the Maxwell.

Shipments of zinc have been made from Georgetown, for which the treatment charges at the Denver and Pueblo smelters were heavy.

A canvass of the three large modern sampling works in Idaho Springs and two plants in Georgetown, which handle the bulk of Clear Creek County's ore product, shows but small difference between the tonnage of 1898 and 1899.

There was an increase in gold, lead, and copper values in the lower end of the county.

A large amount of Colorado and eastern capital is invested in the work, which was encouraged by the steadiness of the silver quotation, the better prices paid for copper and lead, and the turning of the zinc embargo into an item of profit.

The effect of this work began to tell at Idaho Springs during the final quarter of the year. In the year just opened the increase in the number of steady shippers will be large, as in a number of instances development has progressed very near to the producing point.

In the mining world this county ranks high. The machinery used in Clear Creek County is of the very best. Take the Stanley equipment, for example. It is one of the most powerful plants in the State, with its steam safety brake hoisters, compound condensing pumps, air drills, air compressor, and the use of water, as well as steam and air, in conducting the operations of the mines and mills.

The establishment of electric power plants operated by water would make a perceptible change in the mining industry of the county, rendering profitable large bodies of ore.

A number of zinc experiments were made at Georgetown and Silver Plume during the summer months, under control of nonresident firms, which proved successful. An effort was made at Silver Plume with an amended mill to produce a satisfactory quality of zinc concentrates, but the appliances employed left too much iron. An improved plant for the purpose is being constructed. If it succeeds in making the separation, it is certain of all the material it can handle for years.

Mills.	District.	Character.	Daily capacity.
			<i>Tons.</i>
Oneida		Amalgamating	10
Specht	Dumont	Amalgamating and concentration	50
Roberts & Jackson		Concentration	100
Golconda		do	30
Cumberland	Yankee	do	30
Pioneer	do	Amalgamating	30
Wilkee	Idaho Springs	do	30
Anderson	do	do	25
Kittie Clyde	do	do	10
Lombard	Yankee	do	35
Osborne	Fall River	do	10
Mattie	Chicago Creek	do	60
Buekeye		do	10
Mansfield	Dumont	do	10
Humboldt	Ute Creek	do	10
Mixsell	Idaho Springs	do	25
Newton	do	do	40
Turner	do	do	16
Salisbury	do	do	60
Roberts	do	do	10
Allen	do	do	20
Allan	Chicago Creek	do	20
Alice	Yankee	Concentration	150
Lincoln	Idaho Springs	do	25
Smith	do	do	50
Silver Age	do	do	40
Mayflower	do	do	50
Donaldson	do	do	60
Standard	do	do	60
Ohio Gulch	Dumont	do	30
Mansfield	do	do	30
Newton	Idaho Springs	do	40
Salisbury	do	do	30
Maxwell	Silver Plume	do	50

BOULDER COUNTY.

In this county the increase has not been so great, owing to the stagnation caused by the smelter strike. The tonnage for the year shows an increase over that of 1898. A large number of low-grade mines were reopened.

Ward district is taking on new life.

No new territory has been opened up, but a large amount of development work has been done.

No notable change in the character of ores occurred.

No trouble is experienced with water in this district.

The bond and leasing system obtains almost exclusively in the county. The capital invested was largely local, although quite an amount of Eastern money has been placed.

The fuel supply of the county is excellent and the milling facilities ample for immediate wants.

The concentration plant of the Pennsylvania Mining and Milling Company, known as the Culbertson mill, has taken up a number of leases during the year, which are operating at present with success.

The Delano Mining and Milling Company is refitting a 50-ton chlorination mill at Boulder.

The Pennsylvania Mining and Milling Company is erecting a 10-stamp mill for the treatment of low-grade ores mined by that company.

With the advent of the Colorado and Northwestern Railroad, communicating with some of the best camps of the county, the mode of transporting ores to the mills and smelters at the lowest rates ever offered to mine operators has had the effect of opening up many old claims along its line and has placed them, with a number of new prospects, on a paying basis. This road, in connection with the Colorado and Southern, furnishes ample transportation to the county, except the camp of El Dora, which would derive great benefit from the proposed extension of the Colorado and Northwestern Railroad. Well-informed men of the leading camps predict a year of increased prosperity for the county.

Following is a list of active mills:

Mills.	District.	Character.	Daily capacity.
			Tons.
Enterprise.....	Eldora.....	Chlorination	100
Giles.....	Ward.....	Concentration.....	25
Amalgam Co.....	Sugar Loaf.....	Chlorination	30
Livingstone.....	do.....	Cyanide.....	20
Wood Tunnel.....	Gold Hill.....	Concentration, 10 stamps.....	20
Salina.....	do.....	do.....	20
Gray Eagle.....	do.....	Electric belt.....	10
Gale.....	do.....	Concentration and amalgamation, 30 stamps.....	50
Prince Arthur.....	do.....	Concentration, 10 stamps.....	20
Culbertson.....	Boulder.....	Concentration and amalgamation, 60 stamps.....	100
Pennsylvania.....	do.....	Amalgamation, 50 stamps.....	200
Delano.....	do.....	Chlorination	50
Kilton.....	do.....	do.....	12
Eldora.....	Eldora.....	do.....	50
Ward Smelter.....	Ward.....	do.....	50
Silent Friend.....	do.....	Concentration, 20 stamps.....	30
Muller.....	do.....	Concentration.....	20
Montgomery.....	do.....	do.....	18
Humboldt.....	do.....	do.....	18
Binford.....	do.....	Concentration, 10 stamps.....	25
Midget.....	Netherland.....	Concentration, 30 stamps.....	50

SUMMIT COUNTY.

This county is on the western slope of the continental divide, its eastern line about 75 miles from Denver, and is surrounded by Lake, Eagle, Clear Creek, and Park counties, all of which are among the best-known mineral producers in the Rocky Mountains. Its area is about 500 square miles, all mineral bearing.

The large output of placer gold from Summit County in the early sixties was one of the factors in spreading the fame of Colorado as a mining country, and it is estimated that about 5 per cent of its placer deposits have been worked, and in a coarse and primitive manner. The bed rock on nearly all its streams and gulches is from 20 to 70 feet in depth, and only the high bars and benches have been worked, but in the last year several large companies have acquired nearly all the accessible placer ground, and after having prospected thoroughly have erected large hydraulic appliances and dredges on the Blue and Swan, and are now in such condition that the coming year promises a considerable increase in the yield of precious metal.

The old-time sluice boxes and grants are still worked by those who have neither the acreage nor means to equip their ground with modern appliances.

The past year has been in several respects a remarkable one, and notwithstanding a three months' snow blockade in railroad traffic, the output of the county shows a large increase.

Mining has been stimulated by the introduction of plenty of outside capital and the erection of new and improved mills for the treatment of the silver-lead ores.

New shafts will be sunk several hundred feet deeper than any now in existence and will prove the value of the blanket sulphide veins that underlie the valley of the Blue. These veins, or deposits, are supposed to lie at a depth of 300 to 900 feet, and while it is not expected that all the shafts or drill holes will encounter them, there will be enough to prove beyond question the value of the hidden mineral.

Summit county is independent of its placer fields in the production of gold, as all the ranges in the county are long and high, and contain a network of veins, contacts, and blankets rich in gold, silver, copper, and iron.

LODE MINING.

While lode mining has in the past been very much neglected in Summit County, sufficient work has been done to develop several rich mines and to demonstrate that the source of the placer gold is within easy reach of the lode miner.

The number of promising claims, now small producers, are too numerous for a limited review.

Several large milling plants have been built during 1899, equipped with the latest improvements especially adapted to meet the requirements of the ore of each mine, and are almost automatic in action.

In the camps of Robinson and Kokoma the production was not as large as expected, as all the large mines were compelled to shut down during the railroad blockade for lack of fuel.

This district is in the western side of the county and about 15 miles from Leadville, to which point all ore is shipped. The veins are fissure, and contacts range in width from 2 to 35 feet and carry lead, copper,

silver, and gold. The fissures are strong, and several have been opened up for a distance of 4 miles and are found most frequently in the granite. Their formation has been traced to the main range at the head of the Blue River and connecting with the mineral zone running from Lake County through Summit to Clear Creek and Gilpin counties.

FRISCO DISTRICT.

One of the most promising districts of Summit County is Frisco, situated a few miles from Breckenridge, in the heart of the Ten-Mile Range. A number of mines here are constant shippers. The ore is pyritic-copper, iron, and lead, ranging from \$10 to \$300 per ton.

In the Montezuma, Rathbone, and Smoke River districts a number of important strikes of good grade silver-lead ore were made, and this section showed more activity than for many years. Several of the properties were worked at a fair profit.

In the Swandyke region development was large.

The districts alluded to comprise a small portion of the county. The central and northern portions, from Dillon to the Grand River—over 40 miles—is virgin ground for prospecting.

Timber and water are abundant and railroad facilities good.

There is but one public sampler in the county, that at Breckenridge, owned by the Denver Smelting and Refining Company, and it has proved a great convenience to the smelting-ore producers.

During the blockade of last winter it continued to purchase all ore offered.

As fully one-half the mines are patented, leasing prevails on quite a large scale, and the royalty runs from 10 per cent to 35 per cent, depending on the character of the ore.

PARK COUNTY.

Geographically, Park County occupies a central position in the State, being about 120 miles from Denver, on the Colorado and Southern Railroad, with Fairplay as the county seat. The western portion is mountainous, and its entire length is seamed with veins of gold and silver, the former predominating, and all the streams of the county are rich in gold and have been long worked.

Gold was first discovered in Park County in 1859, in Buckskin Gulch and its tributaries, and thereafter in nearly all the gulches and streams of the county.

During the last few years little work has been done. The outlook for all placers is brighter. The old Fairplay placers have not been worked for years, save nominally by leasers, but arrangements have been completed to work them on a very large scale the coming season with modern appliances.

The same condition applies to the Alma placers, which extend from Alma to Montgomery, now known as the Green Mountain placers, of which there has only been about 500,000 cubic yards washed out of an estimated 88,000,000 yards, and which is said to average at least 30 cents. There are a number of smaller placer propositions on the different streams that are worked as the quantity of water will permit.

While many of the large quartz mines of the county show a reduced tonnage, the increase has been in gold values, and it is worthy of note that quite a number of new producers have materialized. In most cases the producing mines are those that were worked in the early years of mining in the State. These old mines are being opened up

again, and some are paying well on the investment, especially where the capital is sufficient to admit of deeper working and better machinery.

WESTON PASS DISTRICT.

The Weston Pass district advanced during the year, and several of its producers shipped to the Leadville smelters.

Sacramento Gulch opened up a few new prospects.

Alma district has been the scene of renewed activity both in its placers and quartz mines.

Puma City, in Tarryall, is a promising new district.

The Fresh-water district, of which the town of Guffey is the center, is situated in the southeastern corner of the county a few miles from Cripple Creek, and is the same general formation. Numerous strikes have been made.

Several new camps, in the same vicinity, are pushing development on a large scale.

THE MILLS.

There are in Park County about 20 mills of different systems, of which the majority are idle through litigation involving the mine upon whose output they are dependent.

The smelter strike during the summer of 1899 had the effect of shutting down nearly all the mines in the county.

All the plants of machinery are using steam, as both wood and water are abundant in nearly every locality.

TOTAL PRODUCTION.

Name of county.	Gold, value.	Silver, value.	Total value, gold and silver.	Lead, value.	Copper, value.	Total value.
Arapahoe	\$62	\$1	\$63			\$63
Boulder	542,631	97,758	640,389	\$1,250	\$13,720	655,359
Clear Creek	541,663	1,654,628	2,196,291	197,131	50,999	2,444,421
Chaffee	214,617	188,576	403,193	53,256	130,324	586,773
Costilla	199	1	200			200
Conejos	5,911	29,418	35,329			35,329
Custer	951	7,683	8,634	37,357	161	46,152
Dolores	46,259	298,761	345,020	17,857	4,583	367,460
Eagle	45,677	56,816	102,493	53,027	1,021	156,541
Fremont	8,141	3,422	11,563	50	1,156	12,769
Garfield	641	10	651			651
Gilpin	1,976,887	436,223	2,413,110	58,579	180,593	2,652,282
Gunnison	69,451	93,406	162,857	62,465	8,039	233,361
Hinsdale	37,991	199,518	237,509	471,924	8,647	718,080
Huerfano	41		41			41
Jefferson	749	312	1,061	34	43	1,138
Lake	2,183,332	9,383,918	11,567,250	2,174,876	1,228,463	14,970,589
Larimer	1,661	6	1,667		430	2,097
La Plata	44,896	31,418	76,314	73,621	3,202	153,140
Las Animas	517	16	533			533
Mesa	21	82,058	82,079		812	82,891
Montrose	330	57,344	57,674		12,352	70,026
Montezuma	15,275	114	15,389			15,389
Mineral	90,825	4,865,676	4,956,501	253,415	3,526	5,213,442
Ouray	1,674,857	2,994,992	4,669,849	337,104	53,829	5,060,782
Park	151,594	92,325	243,919	24,144	1,375	269,438
Pitkin	51,770	5,322,162	5,373,932	1,136,464	3,369	6,513,765
Pueblo	906	1,624	2,530	461	10	3,001
Rio Grande	19,044	3,349	22,393	73	57	22,523
Routt	11,437	1,390	12,827	151		12,978
Saguache	3,659	18,142	21,801	19,690	6,147	47,638
San Juan	990,352	1,529,773	2,520,125	714,809	208,412	3,443,346
San Miguel	1,365,966	1,552,574	2,918,540	175,037	27,980	3,121,557
Summit	258,092	338,997	597,089	179,997	11,407	788,493
Teller	15,658,254	105,551	15,763,805			15,763,805
County unknown	250,828	231,744	482,572	8,381	14,861	505,814
Total	26,265,487	29,679,706	55,945,193	6,051,156	1,975,518	63,971,867

STATEMENT OF BULLION OPERATED ON AT THE UNITED STATES MINT, DENVER, COLO.,
DURING THE CALENDAR YEAR 1899.

Counties.	Gold.	Silver.	Total.
Boulder	\$85,638.55	\$305.39	\$85,943.94
Clear Creek	38,037.68	277.77	38,315.45
Chaffee	41,972.29	219.00	42,191.29
Costilla	198.95	.51	199.49
Eagle	1,258.12	5.28	1,263.40
Fremont	452.37	3.80	456.17
Gilpin	547,184.48	3,192.31	550,376.79
Gunnison	2,168.89	17.89	2,186.78
Garfield	393.37	3.86	397.23
Jefferson	542.29	1.60	543.89
Lake	19,185.48	130.46	19,315.94
La Plata	1,405.26	6.94	1,412.20
Las Animas	269.20	3.29	272.49
Larimer	1,599.00	3.44	1,602.44
Montrose	103.33	.86	104.19
Ouray	967,128.65	9,379.77	976,508.42
Park	20,545.75	99.13	20,644.88
Pueblo	492.73	3.67	496.40
Pitkin	11,609.27	60.36	11,669.63
Rio Grande	4,059.22	.70	4,059.92
Routt	10,693.33	70.14	10,763.47
San Juan	65.83	1.57	67.40
San Miguel	476,756.57	6,118.50	482,875.07
Summit	34,811.97	326.49	35,138.46
Teller	5,864,186.67	2,600.07	5,866,786.74
County unknown	215,536.05	1,726.73	217,262.78
Total Colorado	8,346,295.30	24,559.56	8,370,854.86
Smelters	8,494,466.28	1,224.05	8,495,690.33
Foreign to Colorado:			
Alaska	18,646.71	137.56	18,784.27
Arizona	580,776.52	5,950.57	586,727.09
Central America	1,116.38	15.71	1,132.09
California	10,939.25	86.51	11,025.76
Idaho	6,007.93	13.61	6,021.54
Mexico	5,904.21	29.53	5,933.74
Montana	4,578.15	12.17	4,590.32
New Mexico	95,659.96	392.24	96,052.20
Oregon	687.41	1.87	689.28
South America	1,419.97	5.09	1,425.06
Utah	159,684.27	2,673.77	162,358.04
Wyoming	43,323.86	111.82	43,435.68
Total	928,744.62	9,430.45	938,175.07
Miscellaneous:			
Jewelry	32,873.80	318.59	33,192.39
United States coin	154.78		154.78
Redeposits	1,689.60	16.81	1,706.41
Total	34,718.18	335.40	35,053.58

RECAPITULATION.

Source.	Gold.	Silver.	Total.
Colorado, including smelters	\$16,840,761.58	\$25,783.61	\$16,866,545.19
Foreign to Colorado	928,744.62	9,430.45	938,175.07
Miscellaneous	34,718.18	335.40	35,053.58
Grand total	17,804,224.38	35,549.46	17,839,773.84

V.

IDAHO.

By J. W. CUNNINGHAM,

Assayer in Charge United States Assay Office, Boise, Idaho.

The mineral product of the State of Idaho for the year 1899 shows a small increase in the gold and a decrease in the silver and lead as compared with that of the previous year. The comparison is as follows:

Description.	1898.		1899.	
	Quantity.	Value.	Quantity.	Value.
Gold.....fine ounces..	91,698	\$1,895,566	102,106	\$2,110,718
Silver.....do.....	5,256,700	6,796,541	4,086,413	5,283,443
Lead.....fine pounds..	122,479,275	4,899,171	104,746,768	4,713,604

An unusual activity has been general throughout the gold-bearing districts, many of which have been developing new properties which have not become producing.

The decrease in the silver is shown in the reports from Owyhee and Shoshone counties. In the former one of the large properties has been idle during the year, and in the latter the labor troubles in the Cœur d'Alene mines have caused the falling off of both silver and lead.

GOLD AND SILVER PRODUCED IN IDAHO DEPOSITED WITH GOVERNMENT INSTITUTIONS DURING THE CALENDAR YEAR 1899.

Institutions.	Gold.		Silver.		Total value.
	Standard ounces.	Value.	Standard ounces.	Value.	
Mints:					
San Francisco	454.888	\$8,463.03	100.65	\$117.12	\$8,580.15
Philadelphia	238.487	4,436.97	99.63	115.93	4,552.90
Denver	322.926	6,007.92	26.45	30.78	6,038.70
Assay offices:					
Boise	39,018.301	725,921.88	12,675.15	14,749.26	740,671.14
Helena	14,295.155	265,956.37	2,409.07	2,803.28	268,759.65
New York	1,070.000	19,906.98	105.00	122.18	20,029.16
Seattle	264.325	4,917.67	15.91	18.51	4,936.18
St. Louis.....	72.906	1,356.39	.....	.....	1,356.39
Total	55,736.988	1,036,967.21	15,431.86	17,957.06	1,054,924.27

SOURCE OF THE DEPOSITS AT THE UNITED STATES ASSAY OFFICE, BOISE, IDAHO, CALENDAR YEAR 1899.

Counties.	Gold.		Silver.		Total.
	Fine ounces.	Value.	Fine ounces.	Value.	
Ada	572.088	\$11,826.11	138.64	\$179.25	\$12,005.36
Bannock	554.459	11,461.69	52.93	68.44	11,530.13
Bingham	735.384	15,201.74	67.28	86.99	15,288.73
Blaine.....	1,038.850	21,474.93	817.28	1,056.69	22,531.62
Boise	16,501.562	341,117.56	4,706.45	6,085.11	347,202.67
Canyon.....	383.918	7,936.29	68.69	88.81	8,025.10
Cassia	560.978	11,596.45	43.17	55.82	11,652.27
Custer	546.071	11,288.29	485.76	628.04	11,916.33
Elmore	2,460.305	50,859.02	1,451.82	1,877.10	52,736.12
Idaho	4,872.650	100,726.62	1,909.03	2,468.24	103,194.86
Lemhi.....	3,439.539	71,101.58	553.98	716.26	71,817.84
Lincoln	1,205.563	24,921.19	106.97	138.31	25,059.50
Owyhee	717.036	14,822.45	484.42	626.32	15,448.77
Oneida	536.173	11,083.68	57.02	73.72	11,157.40
Shoshone.....	575.541	11,897.48	345.86	447.17	12,344.65
Washington.....	416.354	8,606.80	118.33	152.99	8,759.79
Total Idaho	35,116.471	725,921.88	11,407.63	14,749.26	740,671.14
Montana	5,664.964	117,105.19	403.81	522.10	117,627.29
Oregon	33,209.084	686,492.69	11,597.46	14,994.69	701,487.38
Utah	41.976	867.72	6.04	7.81	875.53
Washington	74.860	1,547.50	10.92	14.12	1,561.62
Wyoming	27.590	570.34	2.24	2.90	573.24
British Columbia.....	30.370	627.80	7.38	9.54	637.34
Northwest Territory.....	27.903	576.81	7.43	9.61	586.42
Redeposits	12,819.291	264,998.27	2,751.44	3,557.41	268,555.68
Total	87,012.509	1,798,708.20	26,194.35	33,867.44	1,832,575.64

PRODUCT OF GOLD AND SILVER IN IDAHO, BY COUNTIES, CALENDAR YEAR 1899.

Counties.	Gold.		Silver.		Total value.
	Fine ounces.	Value.	Fine ounces.	Value.	
Ada	897	\$18,543	260	\$336	\$18,879
Bannock	768	15,876	107	138	16,014
Bingham	941	19,452	154	199	19,651
Blaine.....	1,504	31,090	177,854	229,953	261,043
Boise	19,055	393,902	5,681	7,345	401,247
Canyon.....	526	10,873	87	113	10,986
Cassia	875	18,088	68	88	18,176
Custer	3,079	63,649	179,366	231,908	295,557
Elmore	3,409	70,470	1,985	2,566	73,036
Idaho	8,048	166,367	2,836	3,667	170,034
Lemhi.....	17,409	359,876	3,551	4,591	364,467
Lincoln	1,611	33,302	150	194	33,496
Oncida	750	15,504	105	136	15,640
Owyhee	34,001	702,863	976,817	1,262,955	1,965,818
Shoshone.....	8,602	177,819	2,737,218	3,539,029	3,716,848
Washington	631	13,044	174	225	13,269
Total	102,106	2,110,718	4,086,413	5,283,443	7,394,161

TOTAL PRODUCT OF IDAHO DURING THE CALENDAR YEAR 1899.

Metals.		Quantity.	Value.
Gold	fine ounces..	102,106	\$2,110,718
Silver	do.....	4,086,413	5,283,443
Lead	pounds..	104,746,768	4,713,604
Total			12,107,765

VI.

MONTANA.

By EUGENE B. BRADEN,

Assayer in Charge, United States Assay Office, Helena, Mont.

The value of the precious metals won by the washing, milling, and smelting of gravel and ore mined in Montana during the calendar year was the largest in the history of the State. The quantity and value of each is shown below, the gold and silver being computed at their coinage rate and the copper and lead at the year's average price:

Description.	Quantity.	Value.
Gold.....Fine ounces..	233, 126. 717	\$4, 819, 156. 95
Silver (coining value).....do.....	16, 850, 754. 85	21, 786, 834. 52
Copper, at \$16.67 per cwt.....Fine pounds..	245, 602, 314. 00	40, 941, 905. 74
Lead, at \$4.47 per cwt.....do.....	20, 344, 750. 00	909, 410. 33
Total.....		68, 457, 307. 54

A comparison of these figures with corresponding data, 1898, shows the following variations:

Metals.	1898.		1899.		Increase.
	Quantity.	Value.	Quantity.	Value.	
Gold fine ounces..	253, 867. 787	\$5, 247, 912. 91	233, 126. 717	\$4, 819, 156. 95	¹ \$428, 755. 96
Silver ² do.....	14, 818, 661. 98	19, 159, 482. 17	16, 850, 754. 85	21, 786, 834. 52	2, 627, 352. 35
Copper fine pounds..	216, 979, 354	26, 102, 616. 29	245, 602, 314	40, 941, 905. 74	14, 839, 289. 45
Lead do.....	21, 403, 592	809, 055. 78	20, 344, 750	909, 410. 33	100, 354. 55
Total		51, 319, 067. 15		68, 457, 307. 54	17, 138, 240. 39

¹ Decrease.

² Coining value.

The above is a gain of more than 33½ per cent in the value of the production over the year 1898. Except that of copper, the several changes in value noted above are those naturally attendant upon the mining industry. Owing to general industrial activity in 1899, and the consequent heavy demand for copper, the high price that prevailed at the opening of the year was maintained throughout. This fact, together with the increase of nearly 28,500,000 pounds in the production of the metal itself, explains the enormous gain of nearly \$15,000,000 in the value of this metal alone.

The price above quoted for 1899 is that of electrolytic copper. The Montana product is of this kind. In former years this quotation was not obtainable, and, necessarily, in computing the value of the Montana output the selling price for "lake copper" was used. This is higher than the price for electrolytic copper, and had it been used in

arriving at the value of the Montana copper in 1899 the gain would have been more than \$18,000,000 over 1898. This latter figure, therefore, more nearly represents the actual value of the increase in copper during the year.

The amounts of gold taken from placers and originating in milling, cyaniding, copper, lead, and smelting ores during 1899, when compared with those of the previous year, were as follows:

Classed as—	1898.		1899.		Increase (+) or decrease (—).
	Fine ounces.	Value.	Fine ounces.	Value.	
Placer bullion	31,662.452	\$654,520.97	28,827.617	\$595,919.73	—\$58,601.24
Mill bullion	80,590.965	1,665,963.10	64,070.159	1,324,447.73	—341,515.37
Cyanides	19,235.180	397,626.46	38,247.583	790,647.71	+393,021.25
From copper ores.....	51,408.020	1,062,698.09	55,706.317	1,151,551.77	+ 88,853.68
From lead ores	8,369.027	173,003.14	7,815.539	161,561.53	— 11,441.61
In smelting ores	62,602.143	1,294,101.15	38,459.502	795,028.48	—499,072.67
Total	253,867.787	5,247,912.91	233,126.717	4,819,156.95	—428,755.96

It will be noted that the most attractive feature in the production of gold in Montana during 1899 was furnished in the mining of copper ores and in the results achieved by the cyanide process. Since the employment of this process in the winning of gold from tailings and low-grade ores on a profitable basis in Montana the annual returns from this source have each year been practically double those of the preceding year until it now reaches the large figure given above. It is not likely that this ratio of growth will be continued in the immediate future, but it is safe to predict that the creditable production already achieved will be maintained and that eventually a greater and more profitable field for cyanide in the winning of gold will be opened in Montana, the importance and extent of which can not at present be accurately predicted.

The gold taken from the cupriferous ores, almost all of which come from the Butte district, was greater in quantity during 1899 than the same yield had been in 1898, due to the larger tonnage of ore mined, and the consequent greater production of the several precious metals contained.

The diminished yields of gold in several of the classes of ore noted are explainable in various ways. The decrease in the amount of gold from placers has been a small but constant one for several years. Because of the unsettled conditions existing some years ago many who had followed quartz mining turned to the washing of gold from the gravels that abound in the State. The records of the Government assay office at Helena show as a result that the number of small and independent producers became largely increased at that time until in 1896 the maximum of this class was reached. Since then, owing to the opening of the new Alaskan gold fields and the improved business conditions of the country, these small placer miners have diminished and comparatively few of them were working in 1899.

The lessened output of gold from mills arose principally in the district around Marysville. In that locality some of the mills were idle throughout the entire year, while the large mills of the Montana Mining Company, Limited, were not worked at full capacity, and were partially closed down for various intervals. In some instances the cyanide process is also replacing the stamp mill and amalgamation.

The heaviest decrease in the amount of gold from any of the classes of ores was for that contained in the smelting ores. Many of the mines of the State did not hold up to their excellent showing of the previous year. This was especially true of properties in Madison County.

The detailed origin of silver in 1899, compared with corresponding figures for 1898, show the following results:

Classed as—	1898.		1899.		Increase (+) or decrease (—).
	Fine ounces.	Coining value.	Fine ounces.	Coining value.	
Placer bullion.....	4,021.33	\$5,199.24	3,592.78	\$4,645.20	— \$554.04
Mill bullion	1,028,619.10	1,329,931.77	2,690,892.07	3,479,133.17	+2,149,201.40
Cyanides	78,006.95	100,857.47	97,684.83	126,299.58	+ 25,442.11
From copper ores	9,495,911.71	12,277,542.46	9,890,572.37	12,787,810.73	+ 510,268.27
From lead ores.....	2,763,991.44	3,573,645.50	2,504,695.24	3,238,393.85	— 335,251.65
From smelting ores	1,448,111.45	1,872,305.73	1,663,317.56	2,150,551.99	+ 278,246.26
Total	14,818,661.98	19,159,482.17	16,850,754.85	21,786,834.52	+2,627,352.35

This table presents a largely increased output of silver as having been a feature of the year's production. The amount won in placer workings is of no importance, being small at best, and varying annually with the gold from the same source. The decrease of silver from lead ores was due to the lessened extraction of this product from the mines of the State. The improvement in the amounts taken from the products treated in the cyanide mills and from the copper ores has the same explanation as that already set forth for the increases of gold from the same sources. The large gain in the silver won in the mills of the State was because of a renewal of operations by plants that had been idle for years. Most important among these were those of the granite and bimetallic properties, at Philipsburg, between whom a consolidation had been effected in the interest of economy in 1898, and a resumption of mining and milling operations undertaken.

It is to this work at Philipsburg that a large percentage of the total gain in the silver output for 1899 is due.

The increase in the amount of copper produced in 1899 came from the larger extraction and reduction of Butte ores during the year, the conditions at both mines and reduction works having been favorable for such a showing. A considerable stock of copper was also held in stock at the close of the previous year by the refineries. This was not shown as production in 1898, but having been marketed in 1899, it is here treated as having been produced in the latter year.

Copper is the paramount feature of the mining industry in Montana. More than 80 per cent of the total values won in the State during 1899 came from the mines at Butte in the shape of gold, silver, and copper. The effect on conditions, both local and general, is enormous. While the number who find direct employment in mining and reducing copper ore reaches into the tens of thousands, it is not greater than those indirectly benefited by the manufacture and sale of the necessary supplies for these employees and for the mines. The towns of Butte, Anaconda, and Great Falls, having a combined population of more than 85,000, exist solely to minister to the mining and smelting industries connected with copper mining. But more important than is all this great advantage to Montana and to the commercial life of the country is the effect on the industrial progress of the world. The maintained high price for copper throughout 1899 proves that the demand for this

metal is genuine and the supply limited for immediate needs. This latter fact, too, is proven in that, while the production has constantly increased, there has been no accumulation of public stocks, and shows that the industrial consumption of the metal has at least kept pace with the production. Nearly one-fourth of the world's supply of copper in 1899 came from Montana. The mines of this State therefore have made possible with their output of copper the expansion of the electrical industry, especially in installations for power transmissions, of shipbuilding, and of marine engineering, besides many other industries, among which are the manufacture of structural materials and conveniences for domestic and public use.

But for the Montana copper to make the supply as large as it was in 1899, the advancement in all of these branches would have been delayed, and in some cases even prohibited.

The mining of lead in Montana continues as the least important of the several branches of mining, the amount of the metal secured having been less in 1899 than for several years previous.

BEAVERHEAD COUNTY.

This county, in 1899, yielded the following metals:

Description.	Quantity.	Value.
Gold fine ounces..	7,822.485	\$161,705.11
Silver (coining value) do....	253,262.01	327,449.87
Copper, at \$16.67 per hundredweight fine pounds..	165,719	27,625.36
Lead, at \$1.47 per hundredweight do....	1,038,894	46,438.56
Total.....		563,218.90

The above figures show largely decreased values from those of the output for the previous year. They originated from the districts at Glendale and Bannack. The operations at the former place were chiefly those of the Hecla Consolidated Mining Company, and included the mining, milling, and reduction by smelting of ores. The extensive operations of this company have continued over a period of many years, and present an unbroken record of profitable results. In more recent years, however, the ore supply has been uncertain, and this has materially curtailed their production. This condition became especially exaggerated in 1899, and while a profit was won, the statement of the manager for that year shows the critical nature of the immediate future for this company. He says:

A review of our operations for the year 1899 shows most unsatisfactory results, arising from the fact that we did not have ore in sufficient quantity. * * * In December, 1899, conditions at the mines promised fairly good results for that month, and January and February, 1900, likewise. Considering these circumstances, the board of directors concluded to take some risk, and declared a 1 per cent dividend (\$15,000) to be paid December 23, hoping they might pay another in January and possibly one in February. Their expectations were not realized. By December 23 the daily ore supply was exhausted, and it became necessary to close down the smelter, perhaps for a month or even longer.

The operations at Bannack were confined principally to the dredging of Grasshopper Creek for placer gold. This was the scene of the first successful work in Montana of handling gravel by machinery, and for some years now the several plants at this point have annually taken a considerable quantity of gold from ground that it had not been prac-

tical to reach by the earlier and more primitive methods of washing, Bannack having been one of the first places that gold was discovered and placer mining commenced in the State. It is probable that a considerable yield of gold will come from the Bannack dredges in 1900.

Some quartz mining is also done in the vicinity of Bannack, the ore is found carrying free gold and worked in stamp mills.

BROADWATER COUNTY.

The precious metals taken from this county in 1899 were as follows:

Description.	Quantity.	Value.
Gold.....fine ounces..	8,262.627	\$170,803.66
Silver (coining value).....do....	144,948.35	187,407.96
Lead, at \$4.47 per hundredweight.....fine pounds..	1,088,036	48,635.21
Total.....		406,846.83

The output of precious metals from this county is also largely decreased from the figures of the previous year. The production originated from all sections of the county, the principal camps being those at Winston, Hassel, Radersburg, and Diamond. The largest decrease comes from the Winston district, where the heavy producers of the previous years were idle or were only able to work at a much lessened capacity.

The development of the mines at this camp, however, was earnestly prosecuted, and at the close of the year conditions at the East Pacific and other properties were believed to be most favorable for an early return to the larger production of former years.

The output from the Hassel district was mostly gold bullion from the Diamond Hill mines. This property consists of a large deposit of a low grade milling product carrying gold, and equipped with a complete and modern stamp mill. An insufficient supply of water for power to run the mill has greatly interfered with profitable operations and curtails the work so that it can only be carried on during the few spring months when the water is more ample. Should this obstacle eventually be overcome, it is probable that this property will add considerably to the output of gold in Broadwater County. The present location of the mill makes fuel for steam power sufficiently expensive to prevent the low values contained in and savable from the ores by milling paying any margin of profits above expenses. Considerable prospecting of various discoveries about Hassel has been done, and the ultimate solution of the power problem at the Diamond Hill mines will bring the district into new prominence and tend to place some of these obscure claims among the producing and active mines of that section.

The Radersburg district continued an output of values in 1899, but little changed in quantity and amount from its output of recent years. Although at one time it was a very active and largely producing camp, it has now settled down to the steady and profitable working of its older properties, the principal of which are the Keating and Blacker mines. Recent discoveries in the district have as yet been unimportant from the standpoint of actual production.

Diamond City is situated near Confederate Gulch, the scene of a very rich placer deposit that was worked extensively in the earliest days of Montana mines. From its gravels about \$19,000,000 in gold

dust has been taken since its discovery. Operations in 1899 were confined to the reworking of portions of the old ground in a small way. A company of Milwaukee capitalists control the greater portion of the Gulch and their winnings in 1899 were the most important at this point. Besides the work done by this company, a number of individuals were washing for gold, their gains varying with the time engaged and the richness of the ground attacked.

While the major part of the production of Broadwater County comes from the above four districts, there are a number of other localities where work has been followed successfully. From the vicinity of Townsend, the aggregate of placer gold secured in small lots by individual miners was considerable.

CASCADE COUNTY.

The precious metal contents of ores mined in this county during 1899 were as follows :

Description.	Quantity.	Value.
Gold.....fine ounces..	2, 128. 526	\$44, 000. 54
Silver (coining value).....do....	912, 723. 21	1, 180, 086. 57
Lead, at \$4.47 per cwt.....fine pounds..	3, 810, 679	170, 337. 35
Total.....		1, 394, 424. 46

The above value is almost double that of the 1898 product, and shows that conditions at Neihart and Barker, the leading metal-producing districts in the county, are highly prosperous. The properties at these camps are distinctively silver-lead producers, and include the Broadwater, Florence, Big Seven, and other well-known mines. The future is promising for a continued large output of the above metals by the mines of Cascade County.

The city of Great Falls is in Cascade County. It is located near the series of rapids that have been formed in the Missouri River. Because of the world-famous reduction works located here, it plays an important part in the production of precious metals in Montana. The enormous water power at this point has been but partially developed and utilized in the location and erection of the mammoth copper smelter and refinery of the Boston and Montana Consolidated Copper and Silver Mining Company and the Great Falls plant of the American Smelting and Refining Company.

The former treats the great tonnage of ore that the company mines from its Butte properties. Many freight trains are daily employed to haul this ore to Great Falls for reduction into pure copper bars. The distance from the mines to these works is 178 miles through a mountainous country and over the main range of the Rocky Mountains, where the heavy and long grades and tunnels are frequent. The expense of this long haul is justified by the lessened cost of treatment because of the water power here available for the operation of these works. In 1899 the output of copper by this company was second in Montana only to that of the Anaconda Copper Mining Company, and the activity created alike for the laboring, the railroad, and the business man was the reason of the prosperity and growth of Great Falls.

The Great Falls plant of the American Smelting and Refining Company is also an important factor in the general prosperity of that city.

This is a custom smelter for the purchase and reduction of ores. At no time have its operations been greater than they were in 1899. Because of the cheap power afforded by the water at this point, the company who own and operate it find it advantageous to smelt at these works all products purchased by them in Cascade County and northern Montana, as well as a large percentage of the silver-lead ores from the mines of British Columbia.

DEER LODGE COUNTY.

Below is a table showing the production of metals in this county during 1899:

Description.	Quantity.	Value.
Gold.....fine ounces..	10,349.123	\$213,935.36
Silver (coining value).....do....	4,493.37	5,809.60
Copper, at \$16.67 per cwt.....fine pounds..	50,000	8,335.00
Total.....		228,079.96

The above values are a heavy decrease from the amounts credited to this county in past years, but due to the segregation by the State legislature, at the beginning of the year, of the northern portion adjoining the main range of the Rocky Mountains, wherein was situated the Bald Butte and other producing mines, and the addition of it to Lewis and Clarke County. Since such division the output from this territory has been credited to Lewis and Clarke County. But for this action of the legislature the production would have been quite close to that of 1898, so that what is now Deer Lodge County maintained about the same production as in previous years. The product consisted of placer gold and mill bullion from the district contiguous to Deer Lodge City, and of mill bullion from Coloma, Cable, and elsewhere.

The city of Anaconda, the location of the famous smelters and refinery of the Anaconda Copper Mining Company, is in Deer Lodge County.

These works are the largest of the kind in the world and give employment to many hundreds. They were in full operation throughout the year. Numerous improvements in the plant and replacement of old methods by new were made to keep the works at their highest efficiency.

The plant at Anaconda comprises what is known as the upper and lower works, the converter plant, and the refinery. All are located on the hillside overlooking the city. Prior to 1891 rail communication between Butte and Anaconda was by the Montana Union Railway. Rates being unsatisfactory and an adjustment not being accomplished, the Anaconda company built and now controls the Butte, Anaconda and Pacific Railway between its mines and works, a distance of 28 miles. Owing to the consolidation of the interests of several of the Butte mines in 1899, the daily tonnage of ore and matte passing over this line on its way to the smelters and refineries was the largest since the location of these works at Anaconda.

The method of reduction at Anaconda embraces the crushing and sizing of the crude ore with water concentration; roasting concentrates; reduction of calcined concentrates and the better grade of crude ore in reverberatory furnaces to copper matte; converting of copper matte

into "blister copper;" smelting in shaft blast furnaces of converter lining with the higher grade and crude ores; poling or casting; refining of "blister copper;" refining of slimes of gold and silver from electrolytic vats. These several processes were described in the Montana report for 1897 in detail.

FERGUS COUNTY.

The values won from ores mined in this county during 1899 were in the following amounts:

Description.	Quantity.	Value.
Gold.....fine ounces..	8,883.774	\$183,643.91
Silver (coining value) do....	5,380.64	6,956.78
Total.....		190,600.69

Nearly the entire product of Fergus County came from the district about Maiden, where the Great Northern Mining and Developing Company treated the ore from the Gilt Edge mine by the cyanide process, they having erected a plant for this purpose in 1898. Besides the values obtained by the above company, considerable amounts of gold were won by parties working on the stray tailings from the former milling of ores from the Spotted Horse mine, a famous gold producer in former years. Another producer was the New Year mine.

FLATHEAD COUNTY.

The metals from Flathead County in 1899 were as follows:

Description.	Quantity.	Value.
Gold.....fine ounces..	802.264	\$16,584.27
Silver (coining value) do....	47,380.14	61,259.16
Lead, at \$4.47 per cwt.....fine pounds..	1,066,199	47,659.10
Total.....		125,502.53

Owing to the development work done at the mines in this county, and to the abandonment of prospecting mills and experimental concentrators with a view to replacing them with larger and more economical plants, the product as shown above is a decrease in 1899 from what was taken out in 1898. Some properties were also in process of sale and transfer, during which time they were idle.

The development of this county was commenced shortly after the building of the coast extension of the Great Northern Railway a few years ago. This made possible the development of its mineral wealth. Unquestionably a wide field for mining is offered, and it is believed that the production will increase as the properties already discovered are brought to proper development and equipment under intelligent and successful management. The industry in 1899 seems to have been in that transitory stage which has characterized all sections of the State in some degree following the first and attempted workings of mines after discovery and prior to larger and more profitable operation.

The recent opening for settlement of the ceded strip from the Black-foot Indian Reservation throws open additional territory in this county to the prospector. It is believed that many discoveries of mineral wealth will be made in addition to those already known. The topographical features of this newly opened region are extremely mountainous. The conditions seem excellent for successful prospecting.

GRANITE COUNTY.

The precious metals won by placer and quartz mining in 1899 were as follows :

Description.	Quantity.	Value.
Gold.....fine ounces..	7, 958. 448	\$164, 515. 72
Silver (coining value).....do....	1, 989, 213. 53	2, 571, 912. 44
Total.....		2, 736, 428. 16

The above figures show the gain in 1899 to have been nearly 86 per cent over those of 1898 and a gain of nearly 255 per cent over those of 1897. The resumption of work in the mines and mills of the Granite and Bimetallic companies at Phillipsburg has already been noted. These properties are distinctively silver producers, and the renewal of operations under a consolidated management in 1898 marked the revival of silver mining as an industry in Montana. The above figures show the degree of success that has attended the experiment, and Montana, although yielding her former title of the "Silver State" to Colorado, points with pride to the work done at Phillipsburg in 1899 under legislation and circumstances generally believed to have been adverse to the profitable operation of silver mines.

During 1899, the Denver and Montana Reduction Company erected a cyanide mill at Bear Mouth to work such custom ores as might be offered for purchase as were suited to this process.

JEFFERSON COUNTY.

The following table shows the production from Jefferson County in 1899:

Description.	Quantity.	Value.
Gold.....fine ounces..	7, 415. 708	\$153, 296. 29
Silver (coining value).....do....	887, 929. 36	1, 148, 029. 88
Copper, at \$16.67 per cwt.....fine pounds..	25, 687	4, 282. 02
Lead, at \$4.47 per cwt.....do....	1, 400, 880	62, 619. 34
Total.....		1, 368, 227. 53

These figures show a decrease from what had been the value of the production in 1898. The largest producing mine in the county in 1899 was the Elkhorn, a property that for many years has enjoyed this distinction, during which time it paid large dividends to its owners.

The ore carried its chief value in the silver contents, both lead and gold being associated with the silver but in less important quantities. For several years the ore supply has been failing, and near the close of

1899 all that could be profitably extracted was exhausted, the pumps were drawn, and the mine finally abandoned to fill with water.

To many, this passing of this historic property from the list of Montana producers in the future, though inevitable and regretted, recalls its bonanza days, when large contributions were made to the mineral wealth credited to the State in the past.

The showing made by the leasers working on the Golden Sunlight group, near Whitehall, was creditable. The output from the Grey Eagle, at Wickes, a recently opened property, proves that it is likely to be an extensive producer and, in some measure, make up for the decrease this county will hereafter suffer in its yield of metals because of the abandonment of the Elkhorn.

The Winscott Mill, a property in the extreme northern part of the county, was in steady operation during the year, and put forth a considerable product of gold bullion.

LEWIS AND CLARKE COUNTY.

The production of metals by the mines of this county was increased in 1899 over that of the preceding year. Following are the figures for 1899:

Description.	Quantity.	Value.
Gold.....fine ounces..	62,535.675	\$1,292,727.13
Silver (coining value).....do.....	203,251.90	262,790.33
Lead, at \$4.47 per cwt.....fine pounds..	500,000.00	22,350.00
Total.....		1,577,867.46

The output of gold by Lewis and Clarke County was the largest of any in the State during the year. The gain in the amounts of gold and silver taken from ores mined in this county in 1899 was a considerable one, and largely arose because of the addition by the State legislature to the territory of this county of the portion that had been segregated from Deer Lodge County. This brought the Bald Butte mine and other properties into Lewis and Clarke County.

At Marysville, the Montana Mining Company did not operate its two large stamp mills at full capacity, one or the other having been closed down at various times, which was determined by the grade and character of the ore supply mined, the process being different in the separate mills to accommodate the varying nature of the mine product.

The falling off thus occasioned was more than made up by this company at its cyanide mill, where the tailings impounded behind settling dams below the mills were treated. The amounts won were the largest since the working of the tailings was first attempted in 1897, and yielded a handsome profit to this company.

A combination stamp and cyanide mill was also in operation at the Belmont mine, near Marysville. After the usual milling by stamps and the gathering of values by amalgamation, the tailings were subjected to an immediate leaching in the cyanide solution and a large portion of the remaining values extracted. The process resulted in the saving of a high percentage of the values and seems to have been most satisfactory.

At the Bald Mountain mine, also near Marysville, a twenty-stamp mill, with pans and settlers for the additional treatment and amalga-

mation of the ore, was in operation during the entire year. The amount of the output from this mill could not be included in the returns of Lewis and Clarke County, as the owner did not furnish a statement of their quantity and value, and it is not known that any of the product was sold.

The Bald Butte mine, some 4 miles from Marysville, kept the forty-stamp mill belonging to that property working at full capacity in 1899. The output of metals by this property makes it second in importance in the county only to the yield by the Montana Mining Company, Limited.

A large tonnage of low-grade ore carrying iron in quantities desirable for fluxing purposes at the smelters, and having lead, silver, and gold in small values contained in the ore, was taken from the War Eagle mine, at Butler, and shipped to the several reduction plants in the State. The mining of this product afforded employment to a considerable number of men during the year.

Other districts in Lewis and Clarke County yielding gold bullion from mills were those at the Empire, Granite Butte, Gould, York, and Unionville. Placer gold was taken from the gulches at Canyon Ferry, Helena, York, and Butler. The Rimini mines continued shipments of concentrating ore and smelting ore in 1899.

The plant of the American Smelting and Refining Company at East Helena handled the largest tonnage in 1899 since its opening for the purchase and treatment of custom ores, this product coming principally from Montana and from the Coeur d'Alene district of Idaho.

Power was furnished by electrical transmission from the dam across the Missouri River at Canyon Ferry. An addition to the works in 1900 is contemplated, which will nearly double the present capacity of these works.

Near East Helena is also the Peck Concentrator, a plant that has been erected for the concentration, at small cost, of custom ores of too low grade for smelting. These works are operated during the entire year.

MADISON COUNTY.

Below is a table showing the output of precious metals in Madison County during 1899:

Description.	Quantity.	Value.
Gold.....fine ounces..	23,708.977	\$490,108.05
Silver (coining value).....do....	104,350.74	134,918.12
Copper, at \$16.67 per ewt.....fine pounds..	40,000.00	6,668.00
Lead, at \$4.47 per cwt.....do....	370,477.00	16,560.32
Total value		648,254.49

This is a heavy decrease from the yield in 1898, the value of the product at that time having been largely over \$1,000,000.

This was due to the culmination in 1899 of several unfortunate features connected with mining in this county, some of which will be overcome in 1900. The working of large ore bodies recently opened in the county and the sale and equipment of properties promise that the output of metals will be heavily increased in the future, and that this advantage will be a permanent one. Both placer and quartz mining are actively followed in Madison County. The principal center of the

former is at or near Virginia City, along Alder Gulch. This was discovered in 1863, and since that date more than \$90,000,000 in gold have been taken from the gravel of the gulch and bars. The leading feature of the operations at this point in 1899 was the work done by dredging machines on the ground at or near the mouth of the gulch. The present plants were installed and first operated in 1899.

The actual amount of gold recovered by them was less important than the actual experience had with the work to be done and the knowledge thus obtained and made available for future guidance. Complete preparations have been made for carrying on continuous work in 1900, and the values then won and the profits realized will determine the success or failure of again working much of the ground in the gulch by these dredging plants. As the length of the gold-bearing gravel in the gulch is about 17 miles, the demonstration that this ground can be thus profitably worked will be most important. The aggregate amounts recovered in 1899 by the various companies, individuals, and Chinamen, also working in this gulch, was a large one. Placer mining was also done in Norwegian, Bivens, Harris, Wisconsin, and other gulches in the South Boulder Mountains. Although Madison County is a large territory, and its surface is broken by the Madison, Tobacco Root, Snow Crest, and Ruby mountains in the southern portion, quartz mining is centered in the northern section of the county in the South Boulder and McCarty ranges of mountains. Pony, Richmond Flat, Norris, Red Bluff, Sand Creek, Gaylord, Sheridan, Twin Bridges, Leiterville, and Virginia City are located in the South Boulder range, while Rochester and Silver Star are at the base of the eastern slope of the McCarty range.

The principal property working at Pony in 1889 was the Clipper group of mines, owned by Elling & Morris. It included a number of claims lying some 2 miles above the town, to which point the ore was hauled for milling at a 20-stamp mill belonging to the property. The ore is free milling and the tailings susceptible of easy and cheap concentration. The mine has been well opened by tunnels; but a long run on the Boss Tweed, to cut the vein at a depth of about 1,200 feet, was the feature of the development in 1899.

Shortly after the close of the year this tunnel encountered the lead as anticipated, and the ore body from subsequent development promises to become one of the largest and most important discoveries ever made in Montana, and should make the output of precious metals from the Pony district in the future a heavy one.

The Garnet Gold Mining Company, of St. Louis, own a mine near Pony, on which a stamp mill was erected in 1898. The output of values from this property has since been greatly increased.

The Monitor and Revenue mines, on Richmond Flat, did not furnish the tonnage of ore that characterized their work in former years, and the loss in the total production to this county was considerable.

The litigation threatened between these companies was avoided by the consolidation of the properties under a single ownership, and in the future it is probable that a return will be made to the heavier yield of ore formerly extracted. One of these properties is the Madisonian mine, whose sale to Chicago capitalists for a large sum is announced, after a thorough examination of the mine had been made and a test of the ores by the cyanide plant erected for such purpose.

The ore bodies in this property are reported to be large and the mill is to be erected sufficiently large to handle the ore from the property.

Norris and Red Bluff are the center of a region in which numerous discoveries have been made and from which small shipments were taken in 1899. At Sand Creek prospecting was active and some ore was taken out. A small amount of bullion was made at the Chile mill from ores extracted at that mine.

In 1898 the May Flower group, near Gaylord, was the largest producing property in the county. The mine product is a high-grade ore, carrying the heaviest value in gold, and is sent for treatment to the smelter. Although the output from these mines was diminished in 1899, it was nevertheless the greatest in value of any of the Madison Courty properties.

The fear entertained for some time that the mammoth smelter built by the Parrot Mining Company at Gaylord for treating the copper ores from the Butte mines would be indefinitely abandoned grew into a settled conviction in 1899. This plant was idle during the entire year. The Leiter mine, at Leiterville, was closed during most of the year. From the vicinity of Sheridan some ore in small lots was taken out for shipment; the values of these have been inconsiderable. Some mining was done near Twin Bridges. The lead smelter at that point after having been remodeled was put into commission, but the results were unsatisfactory and it has again been closed. Virginia City is in Alder Gulch, and the center of the placer mining done in that section. The Kennett mine is also near this place, and after having recently been equipped with a new stamp mill was closed down and remained idle throughout the year.

MEAGHER COUNTY.

The values recovered from ores mined in this county during 1899 were contained in the product shipped from the mines at Castle and vicinity. These values are as follows:

Description.	Quantity.	Value.
Gold.....fine ounces..	242. 857	\$5, 020. 30
Silver (coining value).....do....	150, 020. 86	193. 966. 36
Lead, at \$4.47 per cwt.....fine pounds..	5, 000, 000	223, 500. 00
Total value		422, 486. 66

MISSOULA COUNTY.

The precious metals won in this county during 1899 came from placer mines. Their value was as follows:

Description.	Quantity.	Value.
Gold.....fine ounces..	2, 749. 898	\$56, 845. 44
Silver (coining value) do....	100. 96	130. 53
Total.....		56, 975. 97

PARK COUNTY.

The returns from the production of gold and silver by the mines of this county were as follows:

Description.	Quantity.	Value.
Gold.....fine ounces..	5,883.176	\$121,616.04
Silver (coining value).....do....	458.72	593.09
Total.....		122,209.13

Nearly all of the above came from the vicinity of Gardner, the region tributary to the Boulder River, and the placers near Emigrant Peak.

In the vicinity of Gardner the leading operations were those at Bear Gulch and Crevasse Mountain. At the former place the Bear Gulch Mining Company was engaged in preparing their property for a large future production by the development of the mine, the completion of a mill, and the erection of suitable quarters for employees. Since the commencement of milling operations their output of gold has been considerable. Other companies have acquired property in this camp, and some gold came from their operations in 1899. The activity at this place has restored Park County to the list of producing counties in Montana, it having at one time previously yielded considerable gold. For some years last past the output has been small.

The mines in the Boulder district did not produce largely in 1899, while the yield from the neighborhood of Emigrant Peak was a considerable quantity of placer gold.

SILVERBOW COUNTY.

For many years the output of precious metals of this county has been the largest in the State. The quantities and values in 1899 were as follows:

Description.	Quantity.	Value.
Gold.....fine ounces..	62,038.377	\$1,282,447.08
Silver (coining value).....do....	9,855,831.97	12,742,893.88
Copper, at \$16.67 per ewt.....fine pounds..	245,245,908	40,882,492.86
Total.....		54,907,833.82

The production of the Butte mines dates from 1882. The following table shows the output to have been more than \$475,000,000 during the past eighteen years.

Year.	Gold.	Silver.	Copper.
	<i>Fine ounces.</i>	<i>Fine ounces.</i>	<i>Fine pounds.</i>
1882.....	12,093.750	2,699,296.38	9,058,284
1883.....	14,560.875	3,480,468.75	24,664,346
1884.....	21,776.006	4,481,180.36	43,093,054
1885.....	13,838.297	4,126,677.60	67,797,864
1886.....	31,223.450	5,924,180.38	57,611,485
1887.....	48,175.743	6,958,822.92	78,700,000
1888.....	44,320.062	8,275,768.87	98,504,000
1889.....	31,652.325	6,560,038.75	104,589,000
1890.....	25,704.730	7,500,000.00	112,700,000
1891.....	29,395.356	7,985,089.77	112,383,420
1892.....	36,222.560	8,311,130.82	158,413,284
1893.....	33,807.877	6,668,730.16	159,875,499
1894.....	36,768.015	7,561,124.46	185,194,385
1895.....	41,433.363	10,051,760.52	197,190,659
1896.....	59,815.755	11,120,731.78	228,886,962
1897.....	54,198.037	10,710,815.45	236,826,597
1898.....	55,343.589	8,996,555.01	216,648,077
1899.....	62,038.377	9,855,831.97	245,245,908
Total.....	652,368.167	131,268,203.95	2,337,382,824

Figuring the gold and silver at their coinage values, and copper at 12½ cents per pound, which is believed to be a fair average price for copper during the above period, the value of the total output of these three metals in Silverbow County has been:

Gold	\$13, 485, 644. 80
Silver	169, 720, 506. 11
Copper	292, 172, 853. 00
Total	475, 379, 003. 91

These enormous values have practically all originated at Butte, the greater portion of the production having been restricted to a small area, not exceeding 2 square miles in extent. The mines are in the Granite Mountain, just above the city, and have made Butte the most busy and prosperous place of equal population in the world. Its commercial importance, as the outgrowth of its mining activity, was such that ten years ago the three greatest transcontinental railway systems of the United States were attracted to its gates, and sought to share in the great traffic here centered.

Butte was first settled in 1864. This was due to the discovery of placer gold in Missoula Gulch, now a part of the city. The output and importance of these placers was duplicated elsewhere in neighboring camps of the State, now forgotten, where the ground was richer and conditions more favorable. If the local history of Butte had been uneventful prior to the exhaustion of its gold-bearing gravel, the discovery and working of the silver-bearing ledges on the hill afterwards brought little or no increased importance to the camp. The most interesting fact of this second period was the one that brought the camp into its present prominence. The Anaconda mine, and others of the great properties of to-day as well, were bought, developed, and worked in the fullest confidence that the contained silver values constituted their greatest worth. There was nothing to indicate, and no imagination so wild as to guess, that at a comparatively slight depth the greatest deposits of copper yet known to the world were to be found.

The year 1882 marks the discovery and opening of the Anaconda as the first copper mine at Butte. At that time the dark-red and brown quartz, then being developed for its gold and silver, carried only traces of native copper, or very limited occurrences of the oxide.

While preparing to mill this ore the main shaft on the Anaconda was driven downward until it suddenly entered the rich copper ledge, now famous throughout the world, at a depth of about 300 feet. This led to other and similar discoveries in the camp immediately.

Previous to 1882 an average of 80 per cent of all the copper produced in the United States came from the mines bordering Lake Superior. In the following year, 1883, the Lake Superior region produced 51.6 per cent, Arizona 27 per cent, and Butte 21.4 per cent of the domestic copper. The percentage of the Butte output continued to increase steadily, and in 1887 it became greater than the yield from the Lake Superior mines. This lead has ever since been advanced until in 1898, when 60 per cent of all the world's copper was supplied by the United States, Butte furnishing 41 per cent, Lake Superior 30 per cent, and Arizona 21 per cent of all the domestic production. Thus Butte furnishes a fourth of the copper product of the world, nearly one-half of which is the output of a single company, the Anaconda.

Most of the mines that at present furnish the principal wealth of this district are situated at the head of Dublin Gulch. The mountain spur lying between this gulch and Silver Bow Valley is called Anaconda Hill, from the mine of that name. The region is characterized by gently rounded topographical forms and a general barrenness of aspect. This latter is due largely to the cutting of timber for mine use following the first workings, and to the sulphur-laden fumes from the smelting works since, preventing a renewal of vegetation.

The principal mines of the Anaconda Company lie east of Main street and south of that portion of Butte known as Centerville. Approximately, they form a horseshoe, with the open heel toward Main street, or to the west. On the north arm of this, and lying along the Syndicate lode, are the Mountain Consolidated, Green Mountain, Diamond, and Wake Up Jim mines. The Bell, High Ore, and Modoc are on the Bell Modoc lode, or system of veins, and form the curve at the toe of the shoe to connect the two arms. On the south arm is the famous Anaconda lode, lying along which are the St. Lawrence, Never Sweat, and Anaconda mines. Besides these claims are many others at Butte, owned by the Anaconda-Company, some of which, in point of production, rank closely with those already named, while others are but partially developed and worked as yet. The ground of the Boston and Montana Consolidated Copper and Silver Mining Company is east of and along the continuation of the Anaconda lode. Besides the Mountain View and other mines on the Anaconda lode, this company owns a number of claims in the same vicinity. From these properties is taken the great tonnage of ore that goes for treatment to the Great Falls plant, belonging to this company. The ground of the Montana Ore Purchasing Company adjoins that of the Anaconda and Boston and Montana companies.

From the mine of this company is taken the ore that supplies its smelter at Meaderville. Immediately south of the Anaconda lode, and parallel with it, are the Parrot, Colusa Parrot, and other mines, while to the southwest of the Syndicate lode is the Gagnon.

There are many claims at Butte besides the properties already enumerated; of all, however, the Anaconda lode is the greatest and most important ore producer. It has been opened and traced for a distance of more than a mile. In the ground of the Anaconda Company the lode consists of one broad ledge of ore with smaller and parallel veins that join the main ledge. The strike is from a few degrees north to almost 15 degrees south of east. The dip in the Anaconda mine is almost vertical for 400 feet, when it changes and varies from 60 degrees to 70 degrees south. The width is not uniform. In the Never Sweat mine, at the west end of the lode, it consists of a number of parallel veins, rarely exceeding 15 feet in width, with spurs about 5 feet wide. In the Anaconda mine the main vein is from 25 feet to 40 feet in width, decreasing to 5 feet as it travels eastward through the St. Lawrence into the Mountain View mine, although in places on the 1,300-foot level of the St. Lawrence it is 50 feet wide. The Syndicate lode has been opened continuously by underground workings for a distance of 5,500 feet.

The general direction of the strike is from north 65 degrees east to south 80 degrees east. The dip averages 65 degrees south. This lode is notable because of its wide ore-bearing zone, which is often from 40 feet to 100 feet wide, both near the surface and in depth, although at intermediate points it may decrease to 5 feet.

The Syndicate lode has forks and spurs along it, so that the vein is sometimes double and sometimes divided into parallel veins.

The veins in the Bell-Modoc system, Ground Squirrel, Ramsdell-Parrot, and others of the Butte mines, though varying in details, have many of the general features of the Anaconda and Syndicate lodes.

The scene on the Anaconda Hill is ever a busy one. Both surface and underground workings at all the properties are most comprehensive. Centered about the shafts are mammoth structures for housing the gigantic hoisting engines, air compressors, and steam generating plants. Near by are the carpenter and machine shops, where the mining timbers are framed and the machinery repaired or rebuilt.

Electric generating stations, ore bins, waste dumps, and railroads are also much in evidence. The great warehouses and yards are filled with immense quantities of mine supplies of every description, whose value reaches into the hundreds of thousands of dollars. At the Anaconda properties, in 1898, the machinery for new installations and replacements of old cost \$461,612; timbers, \$429,886; the candles, \$41,761; fuel, \$207,861; labor, \$3,376,502; oil, \$16,976; powder, \$147,296; tools, \$37,427; fuse and caps, \$27,004.

The High Ore mine has the finest general equipment of any on the copper hill. The boiler power is furnished by two sets of boilers, known as the old and new plants. The old plant consists of seven sets, fourteen boilers in all. Of these, twelve are of 80 horsepower each, and two are of 60 horsepower each. The new plant has six boilers of the Scotch marine type, each of 140 horsepower, making an aggregate of 1,920 horsepower at the High Ore plant, as against 1,750 at the Never Sweat, the next in power. Both the old and new boiler plants are connected by a brick flue 100 feet long, 8 feet high, and 6 feet wide, with a new steel stack 150 feet high and 8 feet 9 inches in diameter, weighing 64,000 pounds.

The hoisting engine at the High Ore, though ample for all requirements, is not equal to those at the Never Sweat and Mountain Consolidated mines, but identical with the ones in use at the Anaconda and St. Lawrence. It is a double Poppett valve engine of 2,500 horsepower capacity, with cylinders 30 inches by 72 inches. The flat woven-wire steel cables from the winding drums pass over the sheaves of a steel gallows frame 100 feet above the surface to raise and lower the cages used in the hoisting of ores from the various levels.

The following statistical tables of Montana production, showing the quantity and values of the various metals, their origin by counties, and from the several classes of ores, together with the final disposition of the ores and bullion as to the sale and treatment, have been assembled from confidential returns furnished by the producers. These totals have been verified by comparison with those made from figures and data given by the United States mint and assay offices and the smelters and refineries that handled the Montana product.

DEPOSITS AT THE UNITED STATES ASSAY OFFICE, HELENA, MONT., DURING THE CALENDAR YEAR 1899.

Counties.	Gold.		Silver.		Total value.
	Standard ounces.	Value.	Standard ounces.	Commercial value.	
Beaverhead	1,087.392	\$20,230.51	68.60	\$34.52	\$20,265.03
Broadwater	3,779.406	70,314.47	399.01	204.43	70,518.90
Cascade	10.596	197.13	3.41	1.71	198.84
Choteau	15.053	280.06	.67	.34	280.40
Deerlodge	8,610.137	160,188.49	1,325.97	671.22	160,859.71
Fergus	65.882	1,225.70	10.71	5.52	1,231.22
Flathead	245.035	4,558.77	40.51	21.36	4,580.13
Granite	2,554.676	47,528.79	570.96	289.20	47,817.99
Jefferson	2,735.575	50,894.35	437.12	224.29	51,118.64
Lewis and Clarke	31,996.177	595,277.54	16,109.70	8,182.55	603,460.09
Madison	8,852.409	164,695.89	2,203.97	1,134.62	165,830.51
Meagher	158.730	2,953.13	12.07	6.25	2,959.38
Missoula	3,055.442	56,845.39	112.18	58.84	56,904.23
Park	3,104.988	57,767.18	465.67	241.69	58,008.87
Ravalli	690.839	12,852.79	47.30	24.65	12,877.44
Silverbow	2,067.588	38,466.69	501.81	258.58	38,725.27
Total Montana	69,029.925	1,284,276.88	22,309.66	11,359.77	1,295,636.65
Idaho	14,295.155	265,956.22	2,409.07	1,232.78	267,189.00
Oregon	411.616	7,657.97	91.71	45.89	7,703.86
Washington	508.393	9,458.46	124.48	63.89	9,522.35
Alaska	97.815	1,819.81	9.74	5.16	1,824.97
Northwest Territory	3,599.154	66,960.99	961.81	483.43	67,444.42
British Columbia	10,734.810	199,717.35	5,353.12	2,751.03	202,468.38
Ontario	106.174	1,975.33	13.07	6.54	1,981.87
Jewelry	66.899	1,244.63	15.09	7.56	1,252.19
Total	29,820.016	554,790.76	8,978.09	4,596.28	559,387.04
Grand total	98,849.941	1,839,067.64	31,287.75	15,956.05	1,855,023.69

PRODUCTION OF GOLD AND SILVER IN MONTANA DURING THE CALENDAR YEAR 1899.

Summary by counties.	Gold.		Silver.		Total value.
	Fine ounces.	Value.	Fine ounces.	Coining value.	
Beaverhead	7,822.485	\$161,705.11	253,262.01	\$327,449.87	\$489,154.98
Broadwater	8,262.627	170,803.66	144,948.35	187,407.96	358,211.62
Cascade	2,128.526	44,000.54	912,723.21	1,180,086.57	1,224,087.11
Choteau	13.548	280.06	.60	.78	280.84
Deerlodge	10,349.123	213,935.36	4,493.37	5,809.60	219,744.96
Fergus	8,883.774	183,643.91	5,380.64	6,956.78	190,600.69
Flathead	802.264	16,584.27	47,380.14	61,259.16	77,843.43
Granite	7,958.448	164,515.72	1,989,213.53	2,571,912.44	2,736,428.16
Jefferson	7,415.708	153,296.29	887,929.36	1,148,029.88	1,301,326.17
Lewis and Clarke	62,535.675	1,292,727.13	203,251.90	262,790.33	1,555,517.46
Madison	23,708.977	490,108.05	104,350.74	134,918.12	625,026.17
Meagher	242.857	5,020.30	150,020.86	193,966.36	198,986.66
Missoula	2,749.898	56,845.44	100.96	130.53	56,975.97
Park	5,883.176	121,616.04	458.72	593.09	122,209.13
Ravalli	841.755	17,400.62	95.67	123.69	17,524.31
Silverbow	62,038.377	1,282,447.08	9,855,831.97	12,742,893.88	14,025,340.96
Returns from custom smelters, mints, and assay offices, impossible to classify by counties	21,489.499	444,227.37	2,291,312.82	2,962,505.48	3,406,732.85
Total	233,126.717	4,819,156.95	16,850,754.85	21,786,834.52	26,605,991.47

BULLION OF MONTANA PRODUCTION DEPOSITED AT THE UNITED STATES ASSAY OFFICE HELENA, MONT., DURING THE CALENDAR YEAR 1899.

Origin.	Gold.		Silver.		Total value.
	Standard ounces.	Value.	Standard ounces.	Commercial value.	
Placer gold	21,921.835	\$407,847.62	3,143.57	\$1,614.10	\$409,461.72
Mill bullion	47,108.090	876,429.26	19,166.09	9,745.67	886,174.93
Total	69,029.925	1,284,276.88	22,309.66	11,359.77	1,295,636.65

BULLION OF MONTANA PRODUCTION DEPOSITED AT THE UNITED STATES MINTS AND ASSAY OFFICES DURING THE CALENDAR YEAR 1899.

Institution.	Gold.		Silver.		Total value.
	Standard ounces.	Value.	Standard ounces.	Coining value.	
Mints:					
Denver	246.076	\$4,578.16	24.34	\$28.32	\$4,606.48
Philadelphia	1,932.765	35,958.42	3,865.78	4,498.35	40,456.77
San Francisco	26.186	487.18	3.42	3.98	491.16
Assay offices:					
Boise	6,294.404	117,105.19	448.68	522.10	117,627.29
Helena	69,029.925	1,284,276.88	22,309.66	25,960.33	1,310,237.21
New York	65,427.471	1,217,255.27	859,970.75	1,000,693.22	2,217,948.49
Total	142,956.827	2,659,661.10	886,622.63	1,031,706.30	3,691,367.40

PRODUCTION OF GOLD AND SILVER IN MONTANA (ORIGIN DETAILED) DURING THE CALENDAR YEAR 1899.

Origin.	Gold.		Silver.		Total value.
	Fine ounces.	Value.	Fine ounces.	Coining value.	
Placer bullion.....	28,827.617	\$595,919.73	3,592.78	\$4,645.20	\$600,564.93
Mill bullion	64,070.159	1,324,447.73	2,690,892.07	3,479,133.17	4,803,580.90
Cyanide mill bullion.....	38,247.583	790,647.71	97,684.83	126,299.58	916,947.29
In copper ores.....	55,706.317	1,151,551.77	9,890,572.37	12,787,810.73	13,939,362.50
In lead ores	7,815.539	161,561.53	2,504,695.24	3,238,393.85	3,399,955.38
In dry ores and concentrates, classed as smelting ores	38,459.502	795,028.48	1,663,317.56	2,150,551.99	2,945,580.47
Total	233,126.717	4,819,156.95	16,850,754.85	21,786,834.52	26,605,991.47

ORIGIN, BY PERCENTAGES, OF THE PRODUCTION OF GOLD AND SILVER IN MONTANA DURING THE CALENDAR YEAR 1899.

Origin.	Percentage.	
	Gold.	Silver.
Placer bullion	12.37	0.03
Mill bullion	27.50	15.92
Cyanide mill bullion	16.37	0.60
Copper ores	23.90	58.70
Lead ores	3.36	14.87
Dry ores	16.50	9.88
Total.....	100	100

PRODUCTION OF COPPER AND LEAD IN MONTANA DURING THE CALENDAR YEAR 1899.

Summary by counties.	Copper.	Lead.
	<i>Fine pounds.</i>	<i>Fine pounds.</i>
Beaverhead.....	165,719	1,038,894
Broadwater		1,088,036
Cascade		3,810,679
Deerlodge.....	50,000	
Flathead.....		1,066,199
Granite	75,000	
Jefferson	25,687	1,400,880
Madison	40,000	370,477
Meagher		5,000,000
Missoula		250,000
Ravalli.....		150,000
Silverbow	245,245,908	20,000
Custom smelters in addition to the above, not possible to distribute by counties.....		6,149,585
Total production.....	245,602,314	20,314,750

DISPOSITION OF GOLD AND SILVER OF MONTANA PRODUCTION, DURING THE CALENDAR YEAR 1899.

Disposition.	Gold.		Silver.		Total value.
	Fine ounces.	Value.	Fine ounces.	Coining value.	
Deposited at the United States mints and assay offices.....	128,661.144	\$2,659,661.10	797,960.37	\$1,031,706.30	\$3,691,367.40
Shipped to custom smelters and refineries by producers.	104,465.573	2,159,495.85	16,052,794.48	20,755,128.22	22,914,624.07
Total	233,126.717	4,819,156.95	16,850,754.85	21,786,834.52	26,605,991.47

TOTAL PRODUCTION OF PRECIOUS METALS IN MONTANA DURING THE CALENDAR YEAR 1899.

Description.	Quantity.	Value.
Gold.....fine ounces..	233,126.717	\$4,819,156.95
Silver (coining value).....do....	16,850,754.85	21,786,834.52
Copper, at \$16.67 per cwt.....fine pounds..	245,602,314	40,941,905.74
Lead, at \$4.47 per cwt.....do....	20,344,750	909,410.33
Total.....		68,457,307.54

PRODUCTION OF GOLD, SILVER, COPPER, AND LEAD IN THE STATE OF MONTANA, FROM THE YEAR 1862 TO 1899 (INCLUSIVE).

Year.	Gold.	Silver. ¹	Copper.	Lead.	Totals.	Yearly increase.
						<i>Per cent.</i>
1862 to 1881 (inclusive) ² .	\$200,000,000	\$11,000,000	-----	-----	\$211,000,000	-----
1882	2,550,000	4,370,000	\$1,539,860	-----	8,459,860	-----
1883	1,800,000	6,000,000	3,452,960	\$226,424	11,479,384	37½
1884	2,170,000	7,000,000	5,386,500	246,326	14,802,826	31
1885	3,400,000	11,500,000	6,779,800	274,350	21,954,150	50
1886	4,422,000	13,849,000	5,761,200	494,132	24,526,332	12
1887	5,978,536	17,817,548	8,853,750	607,662	33,257,496	35½
1888	4,200,253	15,790,736	15,103,946	569,160	35,664,095	7½
1889	3,500,000	19,393,939	13,334,970	456,975	36,685,884	3
1890	3,300,000	20,363,636	16,656,437	675,392	40,995,465	11½
1891	2,890,000	20,139,394	14,377,336	1,229,027	38,635,757	35½
1892	2,891,386	22,432,323	19,105,464	990,035	45,419,208	18
1893	3,576,000	21,858,780	16,630,958	964,089	43,029,827	35
1894	3,651,410	16,575,458	17,233,718	730,551	38,191,137	311
1895	4,327,040	22,886,992	21,114,869	754,360	49,083,261	28½
1896	4,380,671	20,324,877	25,356,541	670,010	50,732,099	3½
1897	4,496,431	21,730,710	26,798,915	928,619	53,954,675	6
1898	5,247,913	19,159,482	26,102,616	809,056	51,319,067	35
1899	4,819,157	21,786,835	40,941,906	909,410	68,457,308	33
Total.....	267,600,797	313,979,710	284,531,746	11,535,578	877,647,831	-----

¹ Coining rate. ² No annual compilations were made prior to 1881. ³ Decrease.

VII.

NEVADA.

By R. K. COLCORD,

Assayer in charge of the United States Mint, Carson City, Nev.

Nevada's production of gold and silver for the calendar year 1899 was:

Gold	\$2, 498, 910
Silver	1, 241, 880
Total	3, 740, 790

Compared with corresponding values for the year 1898, these figures show a falling off in gold of \$613,887, and a falling off in silver of \$24,800.

The tables herewith submitted show the amount and value of gold and silver produced from the mines of the State of Nevada for the calendar year ended December 31, 1899. In procuring the same every source of information has been utilized; comparisons made, one with the other, and great care taken to avoid duplicating.

There has been no material change in the mining situation throughout the State during the past year, nor have there been any important discoveries in the way of new mines.

There is, however, a fair prospect of important developments in copper mines during the present year. Some sales have been made, and quite extensive operations are being carried on at Golconda, in Humboldt County, and at Siegleton, in Esmeralda County.

The accompanying compilation of the total product of the mines of the Comstock Lode, bringing the data up to January 1, 1900, is from the pen of Mr. Alfred Doten, and was, as far as was possible, taken from the official records of the several mining companies.

PRODUCT OF NEVADA FOR THE YEAR 1899.

County.	Gold.	Silver (coining value).	Total.
Churchill	\$1, 800	\$4, 500	\$6, 300
Douglas	1, 200	120	1, 320
Elko	242, 000	42, 350	284, 350
Eureka	179, 100	485, 660	664, 760
Esmeralda	177, 800	41, 000	218, 800
Humboldt	33, 000	18, 000	51, 000
Lander	87, 170	33, 000	120, 170
Lincoln	1, 267, 000	280, 000	1, 547, 000
Lyon	77, 850	11, 200	89, 050
Nye	58, 700	6, 480	65, 180
Storey ¹	143, 200	258, 220	401, 420
Washoe	50, 500	2, 800	53, 300
White Pine	179, 590	58, 550	238, 140
Total	2, 498, 910	1, 241, 880	3, 740, 790

¹ \$95,172 gold and \$205,800 silver, product of tailings, included in total.

SOURCE OF PRODUCTION.		Fine ounces.
Gold:		
Quartz		119,975
Placer		910
Silver:		
Quartz		732,807
Lead ores.....		179,070
Copper ores.....		50,818

ABSTRACT STATEMENT FROM THE QUARTERLY ASSESSMENT ROLLS OF THE PROCEEDS OF THE MINES OF NEVADA.

FOUR QUARTERS ENDED DECEMBER 31, 1899.

Counties.	Quantity ex- tracted.		Gross yield or value.	Actual cost of—		Actual cost of reduc- tion.		Total cost.
				Extract- ing.	Transpor- tation.	Free mill- ing.	Freiberg process.	
	<i>Tons.</i>	<i>Lbs.</i>						
Elko	50,184	500	\$198,504.78	\$107,984.33	\$20,554.37	\$30,295.24	\$29,222.54	\$188,056.48
Eureka	18,862	1,400	201,147.56	183,721.30	16,471.38	.....	99,741.95	299,934.63
Esmeralda ¹ ...	1	300	5,394.42	2,076.70	50.00	25.00	.....	2,151.70
Lincoln	116,916	943	1,301,048.10	426,158.16	40,483.18	989,985.57	.....	1,456,626.91
White Pine ² ..	3,915	1,000	179,595.37	94,814.98	66,928.67	12,778.80	10,876.21	185,398.66
Total....	189,878	4,143	1,885,690.23	814,755.47	144,487.60	1,033,084.61	139,840.70	2,132,168.38

¹ Esmeralda County reports for March quarter only.
² White Pine County reports for June, September, and December quarters only.

SUMMARY FOR THE YEAR 1899.

[Reported to State comptrollers by county auditors. Silver computed at market value.]

Items.	Ores.	Tailings	Total product.
Gross yield, or value.....	\$1,885,690.23	\$190,913.13	\$2,076,603.36
Actual cost of—			
Extraction	814,755.47	15,884.84	.....
Transportation	144,487.60	25,741.95	.....
Reduction—			
Free milling	1,033,084.61	117,637.85	.....
Freiberg process.....	139,840.70	.....	.....
Total cost	2,132,168.38	159,264.64	2,291,433.02

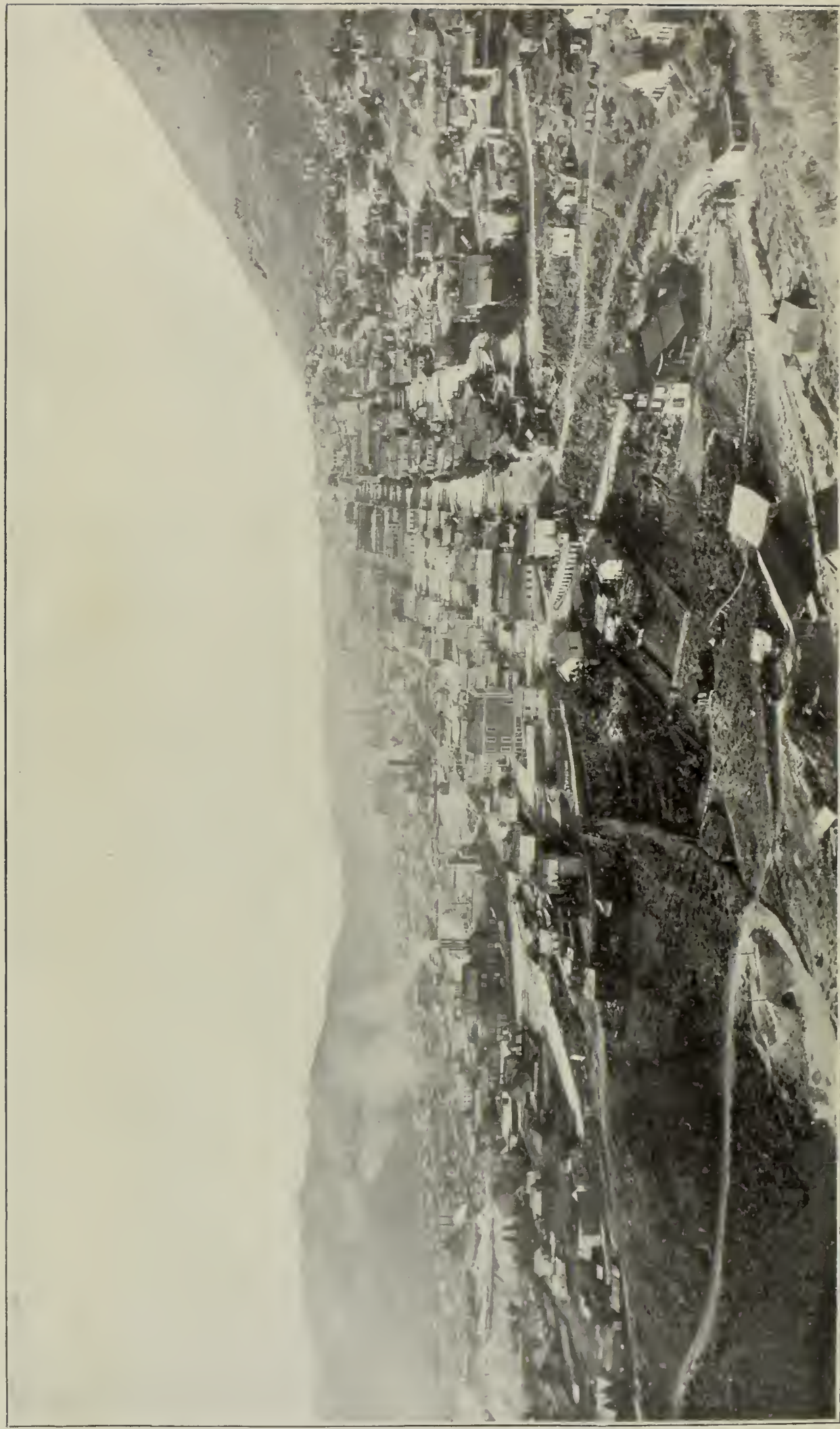
QUANTITY EXTRACTED FOR FOUR QUARTERS ENDED DECEMBER 31, 1899.

	Tons.	Pounds.
Ores.....	189,880	143
Tailings.....	61,338	.....
Total	251,218	143

RECAPITULATION.

[Silver computed at coining value.]

Source of production.	Value.
Product of four quarters ended December 31, 1899, as reported by county auditors to State comptroller.....	\$2,736,167.70
Product of the year reported by mints, assay offices, individuals, mining and milling companies, etc., but not included in reports of county auditors to State comp- troller	1,004,622.30
Total	3,740,790.00



VIRGINIA CITY, LOOKING SOUTH FROM CEDAR HILL AND THE SIERRA NEVADA MINE TOWARD THE DIVIDE, WITH THE TOWN OF GOLD HILL BEYOND—ALONG THE BASE OF MOUNT DAVIDSON, WHICH APPEARS ON THE RIGHT.

Simply the surface of the Comstock Lode, which lies directly beneath the foundation of the city, passing onward beneath The Divide through Gold Hill and toward Carson River.

THE COMSTOCK LODE.

BY ALFRED DOTEN, *Virginia City, Nev.*

The historically famous lode, ledge, or reef of silver and gold ore, known as the "Comstock lode," situated in Storey County, Nev., through its enormous yield of the precious metals, adding over \$400,000,000 to the financial wealth of the country and the world during the last forty years, established a national reputation as the richest and most productive mine in America.

HOW THE GREAT SILVER LODE WAS DISCOVERED.

As early as 1850 placer gold diggings were found in Gold Canyon, a tributary of Carson River, by immigrants from the East on their way to California, and subsequently gold washing was also conducted in Six Mile Canyon, the next large ravine, 2 miles north. Year by year the gold hunters worked along up both ravines until they finally struck rich "pay" in the decomposed surface croppings of the prominent old quartz ledge crossing the head of both ravines, and thus it was that the Comstock lode was practically discovered in June, 1859, subsequently receiving its name from Henry Comstock, one of its first mining locators.

Later on, about August and September, the miners began to understand why the gold they had been washing out in the canyon below the big quartz ledge was worth only about half as much as that in the mines of the western or California slope of the Sierra Nevada. The vein material was found to be rich in silver, as well as in combination with gold, thus solving the problem, and the famous "Washoe" excitement followed the discovery of the first noted silver mine in the United States.

TOPOGRAPHICAL AND GENERAL CHARACTERISTICS.

This great ore vein is principally situated along the eastern slope of Mount Davidson, the most prominent elevation of a spur, or offshoot from the main range of the Sierra Nevada, and about 20 miles from the State line between Nevada and California. The general course of the lode is nearly north and south, with a dip or inclination of about 45 degrees to eastward to its lowest depth, and it really includes a series of 30 or 40 mines, or mining locations immediately adjoining each other and of various names and degrees of bullion merit.

It is, generally speaking, 3 or 4 miles in length by a quarter of a mile, more or less, in width, and of unknown depth, the downward explorations of the great ore channels not having gone deeper than about 3,300 feet. The general vein matter is quartz and porphyry, the quartz being the "gangue" carrying the precious metals, and the inclosing walls are well-defined diorite or syenite on the west, and a porphyrite or trachyte formation on the east, interspersed with quartz and clay seams, making the actual "east wall" of the Comstock a somewhat indefinite proposition. The ore is free-milling and easily reduced.

Virginia City is located immediately over and upon the northern portion of the lode, as is the town of Gold Hill upon the southern, the two places being nominally separated by municipal line on a slight

elevation, appropriately called the "Divide." Both towns together cover the main productive portion of the lode, about 2 miles, and are naturally outgrowths of the great gold and silver mines beneath their foundation. North of Virginia the ore belt spreads out and is lost in various disappearing branches, and so also south of Gold Hill, the main branch following 2 miles down the canyon to Silver City, while others apparently swing around across American Flat.

Gold Hill received its peculiar name from a rocky eminence, 40 or 50 feet high, in the head of Gold Canyon, which turned out to be, in reality, a bold outcrop or one of the richest "chimneys" of the Comstock Lode. The gold hunters, for years working along up the canyon, finally tracked upon it as the real source of their gold, and Sandy Bowers and a few others located the whole of the little hill directly in 10-foot claims. The decomposed quartz was wonderfully rich in gold, as was also the sound rock itself. Consequently the hill did not last long, and its place soon became literally a hollow in the ground. The town was naturally built on the steep slopes and hillsides immediately surrounding, still retaining the name of Gold Hill, with the hill left out.

IMMENSE WEALTH OF THE BONANZA DEPTHS.

Like all other valuable and extensive ore veins or notable mineral deposits, the great richness of the Comstock was discovered at the surface, or it would still be unknown, and the rich ore found was naturally followed downward into the mining depths, paying gloriously from the start. Many fine "kidney" or "canoe" shaped bodies or oblong deposits of rich ore were met with all along the lode as depth was attained, the intervals between being low-grade ore or barren quartz and porphyry with clay seams. The various working levels in the mines are generally 100 feet apart, after the style of "stories" or "flats" in big city tenement houses, the hoisting "cages" in the shafts corresponding with the "elevators."

Thus the two greatest and richest "bonanzas," yielding the most millions each, were found principally below the 800 level—800 feet below the surface; that in the Consolidated Virginia and California mines, the richest of all, extending downward about 800 feet, or to the Sutro Tunnel level, 1,600 feet vertically below the surface. It was over 1,000 feet long and the "heart" of it was over 100 feet wide.

The great Crown Point and Belcher bonanza, in the Gold Hill section, was, at about the same depth, one-third as large, and yielded about one-third as much—over \$60,000,000. But such desirable bonanzas were like "angels' visits," and exceptions to the general character of the lode—long time between bonanzas.

GRAND COMSTOCK BULLION SUMMARY.

The annexed tabular statement "A" gives a complete summarized record of the bullion product of the Comstock Lode by calendar years from the discovery, or commencement of mining operations, in 1859, to the present time. The principal difficulty encountered in its compilation was from scarcity of reliable data, few official records of those earliest times, forty years ago, having been preserved, or being readily found. The books and early clerical records of the various mining companies were also not all kept with much regularity or uniformity

of system. Adequate attention was also not paid to recording the relative proportions of gold and silver in the bullion, it being simply entered upon the books as bullion, or what it sold for in coin at market rates. The proportionate classifications have therefore been arrived at as correctly as possible through approximation, assayers' percentages, and figures given by leading mining companies.

The general average of Comstock bullion, especially in the flourishing bonanza years, was about 60 per cent silver and 40 per cent gold. Latterly, however, conditions have become reversed, and gold again predominates, as it did in the earliest years. The hearts of the bonanzas have all shown more silver than their outskirts, or surface. Statement "A" shows quite plainly that any prevalent popular idea of the Comstock being at any time exclusively a silver mine is considerably erroneous.

A.—THE COMSTOCK LODE.

Total production of gold and silver in forty years, or since discovery and commencement.

Years.	Ore (tons).	Gold.	Silver.	Total.
1859		\$30,000.00		\$30,000.00
1860	10,000	550,000.00	\$200,000.00	750,000.00
1861	140,000	2,500,000.00	1,000,000.00	3,500,000.00
1862	250,000	4,650,000.00	2,350,000.00	7,000,000.00
1863	450,000	4,940,000.00	7,460,000.00	12,400,000.00
1864	680,450	6,400,000.00	9,600,000.00	16,000,000.00
1865	430,745	6,133,488.00	9,700,232.00	15,833,720.00
1866	640,282	5,963,158.00	8,944,737.00	14,907,895.00
1867	462,176	5,495,443.20	8,243,164.80	13,738,608.00
1868	300,560	3,391,907.60	5,087,861.40	8,479,769.00
1869	279,584	2,962,231.20	4,443,346.80	7,405,578.00
1870	238,967	3,481,730.16	5,222,595.24	8,704,325.40
1871	409,718	4,099,811.46	6,149,717.19	10,249,528.65
1872	384,668	4,894,559.86	7,341,839.79	12,236,399.65
1873	448,301	8,668,793.40	13,003,187.13	21,671,980.53
1874	526,743	8,990,714.06	13,486,071.09	22,476,785.15
1875	546,425	10,330,208.62	15,495,312.92	25,825,521.54
1876	598,818	12,647,464.08	18,971,196.12	31,618,660.20
1877	562,519	14,520,614.68	21,780,922.02	36,301,536.70
1878	272,909	7,864,557.64	11,796,836.47	19,661,394.11
1879	178,276	2,801,394.33	4,202,091.49	7,003,485.82
1880	172,399	2,051,606.00	3,077,409.00	5,129,015.00
1881	76,049	430,248.00	645,372.00	1,075,620.00
1882	90,181	697,385.60	1,046,078.40	1,743,464.00
1883	125,914	802,539.54	1,203,809.29	2,006,348.83
1884	188,369	1,261,313.60	1,577,438.40	2,838,752.00
1885	226,147	1,729,531.25	1,415,071.04	3,144,602.29
1886	238,780	2,054,920.15	1,681,298.31	3,736,218.46
1887	223,682	2,481,176.85	2,030,053.78	4,511,230.63
1888	271,152	3,169,209.07	4,458,058.66	7,627,267.73
1889	286,144	2,590,973.32	3,358,949.95	5,949,923.27
1890	286,075	1,992,349.03	2,988,523.56	4,980,872.59
1891	188,647	1,380,857.02	2,071,285.53	3,452,142.55
1892	133,678	1,043,158.86	1,130,088.77	2,173,247.63
1893	109,780	1,123,262.54	748,841.70	1,872,104.24
1894	97,049	768,880.63	512,587.09	1,281,467.72
1895	63,558	548,873.68	365,915.79	914,789.47
1896	39,240	340,253.36	226,835.57	567,088.93
1897	17,850	223,808.63	149,205.76	373,014.39
1898	10,766	123,023.89	82,015.92	205,039.81
1899	6,780	103,006.74	68,671.16	171,677.90
Total	10,663,381	146,232,454.05	203,316,621.14	349,549,075.19
Mill tailings added from Statement B				17,469,863.16
Grand total				367,018,938.35

Confirmatory of the foregoing statement (A), Mr. J. C. Corey, who was one of the original locators of Comstock mining claims, and who managed the first quartz mill in 1859, is substantiated by others in estimating the entire yield for that, the discovery year, at \$30,000, all supposedly gold. Estimates for the second year, 1860, when the

“rush” came in, varied excitedly, some running it up to over \$2,000,000, but Almarin B. Paul and Dr. E. B. Harris, who started the first two steam mills in Gold Canyon, below Gold Hill, agree in stating it at \$750,000, nearly one-third of which was silver. They are corroborated by Mr. Corey and other competent authorities, all agreeing as to the correctness of the figures given, together with the preponderance of gold—about 70 per cent—in the bullion product of the first four years, also regarding the amount and quality of bullion produced in 1863, when silver came out ahead.

The records of Wells, Fargo & Co.’s Express and also J. D. Hague’s report on the Mining Industry of the Fortieth Parallel, made in 1880 by order of the Government, were also of material assistance in furnishing the most authentic and reliable figures for the first ten years. All since then have been taken direct from the official quarterly sworn statements of mining superintendents to county assessors for bullion taxation purposes and from the secretaries’ books of the various mining companies themselves.

This carefully compiled statement places the total bullion product of the Comstock lode to date at over \$367,000,000, according to the most competent and officially reliable authorities. But there are others which are not similarly obtainable, yet are nevertheless well understood by mining men and all familiar with Comstock mining management and manipulation. Add \$40,000,000, estimated gross yield from sundry quiet mining and milling contracts, noted leases of choice mining ground to favored friends, silent partners, etc., in the old flush and easy times at nominal rates, which only appear on the books and quarterly statements as “ores sold” (\$50 per ton for \$500 ore), together with other confidential pickings and surreptitious leakages from first to last, and the total amount may be easily carried up to over \$400,000,000. Government expert Church figured it at that sum in 1878, and it certainly is not overestimated now. In fact, it is a popular belief among old residents and prominent mining men that the honest yield of the old Comstock has been over \$500,000,000.

EARLY COMSTOCK ORE-REDUCTION MILLS.

The first stamp mill for crushing Comstock ore came over the Sierra Nevada from California the last of August, 1859, the discovery year, and was set up at the mouth of Gold Canyon, near Carson River, 5 or 6 miles below Virginia, and Gold Hill. It had four stamps of 400 pounds each in its battery, was run by horses with an old thrashing-machine “horsepower,” and started into practical operation October 14, under the management of J. C. Corey, crushing ore from the Logan & Holmes claim in the Gold Hill croppings of the Comstock, the gold from the batteries, wet process, being caught on amalgamated copper plates. The mill ran but a few weeks, or until stopped by freezing weather and wintry storms, there being no available lumber at hand to house it in properly.

The ore was worked solely for gold, which brought only \$8 per ounce, yet silver was not suspected to be the cause of its inferiority.

There were also two small Mexican “arrastras” worked by 1-mule power each for a few weeks till winter, grinding up some of the decomposed ore croppings on the Ophir mining location at Virginia, getting the same quality of gold, and parties with pans and rockers washed it

out by the pound. Yet, even when the exceedingly troublesome heavy "black stuff" in the vein material was discovered to be the richest sulphurets of silver—almost the pure metal—no one could work it or make it available, except by sending a few mule loads over to California for experimental treatment.

With the rush to the new silver discovery during the next season, 1860, came other mills from California, the first two of which to get into operation, located in Gold Canyon, were by Almarin B. Paul and Dr. E. B. Harris, both starting the same day. After that plenty more mills were started at Virginia, Gold Hill, Six Mile Canyon, and along Carson River, as well as two or three over in Washoe Valley.

The ore not being refractory with foreign mineral complications, but simply free-milling gold and silver ore, the mills were mostly of the regulation style, fitted with stamp batteries for wet crushing and amalgamating pans and settlers for concentration.

GREAT VALUES IN MILL TAILINGS.

In the earliest Comstock ore reductions the first lucrative proposition was in the careful treatment of the rich ores and the saving of all possible in the mill, what got away in the tailings being deemed of secondary consideration or hardly worth the extra trouble and cost of saving. Thus it was that no regular statistical record was made or officially kept of any considerable amounts worked or revenue derived from mill tailings for the first ten years or until 1871, although the official bullion record incidental to the tax levied upon the net proceeds of mines was commenced in 1867, four years previously. Blanket sluices and other saving appliances were adopted at the mills to catch the heavy sulphurets, and dams and reservoirs placed for the purpose, caught up extensive tailings deposits for future reference.

A much larger proportion of silver than of gold passes away in the tailings—about three parts silver to one of gold. Various devices have been adopted for working these immense deposits of tailings, but the latest and most thoroughly efficient seems to be the cyanide process, plants for which are established on Carson River and at Silver City.

As will be seen by reference to the annexed tabular statement B, the bullion realized from mill tailings adds considerably to the amount of Comstock ore yield, and the net proceeds add acceptably to the bullion source of revenue in State and county taxation. The profit shown is not large in proportion to the amount of capital handled or invested, but it is sufficiently remunerative to keep many men employed at good wages for several years to come:

B.—WEALTH RECOVERED FROM MILL TAILINGS.

Year.	Tons.	Gross yield or value.	Total cost (handling, re- duction, etc.).	Net yield or value.
1871 ¹	342,657	\$1,491,167.61	\$1,274,027.36	\$217,140.25
1872 ¹	386,059	1,255,399.53	1,132,780.37	122,619.16
1873 ¹	162,357	778,981.69	718,192.63	60,789.06
1874 ¹	84,178	555,147.00	488,226.16	66,920.84
1875 ¹	78,628	462,219.54	370,961.33	91,258.21
1876 ¹	99,611	654,769.84	535,977.68	118,792.16
1877 ¹	129,639	1,169,265.28	928,266.72	240,998.56
1878 ¹	208,601	1,526,852.03	1,081,521.77	445,330.26
1879 ¹	215,626	1,481,909.75	997,435.44	484,474.31
1880 ¹	181,563	1,028,485.96	746,286.21	282,199.75
1881 ¹	141,699	664,443.02	550,812.11	113,630.91
1882 ¹	98,019	383,251.97	292,787.21	90,464.76
1883 ¹	68,892	188,725.85	186,416.40	2,309.45

¹ Silver product computed at market rates.

B.—WEALTH RECOVERED FROM MILL TAILINGS—Continued.

Year.	Tons.	Gross yield or value.	Total cost (handling, re- duction, etc.)	Net yield or value.
1884 ¹	92,207	\$329,553.13	\$289,248.51	\$40,304.62
1885 ¹	69,521	230,893.36	204,477.44	26,415.92
1886 ¹	62,658	230,022.55	191,295.13	38,727.42
1887 ¹	19,058	46,916.56	43,955.41	2,961.15
1888 ¹	47,193	121,919.40	100,649.15	21,270.25
1889 ¹	37,156	127,810.92	109,115.64	18,695.28
1890 ¹	52,516	166,160.48	136,943.91	29,216.57
1891 ¹	70,252	207,279.68	196,399.16	10,880.52
1892 ²	27,793	145,799.00	77,915.80	13,551.44
1893 ²	61,431	269,107.01	217,333.54	51,773.47
1894 ²	4,600	61,325.00	18,450.00	2,550.00
1895 ²	40,797	231,928.00	152,720.28	20,206.37
1896 ²	50,729	237,000.00	166,480.73	42,325.07
1897 ²	48,407	204,976.00	131,634.26	10,023.37
1898 ²	29,316	217,484.00	64,680.80	8,780.54
1899 ²	54,196	300,972.00	149,149.88	21,692.62
Total	2,965,359	14,769,766.16	11,554,141.03	2,696,302.29
Silver produced from 1871 to 1892, inclusive, computed at coinage value added		2,700,097.00		
Total of tailings		17,469,863.16		

¹Silver product computed at market rates. ²Silver product computed at coining value.

NOTE.—Silver value of tailings from 1871 to 1892, inclusive, computed at market value. From 1893 to 1899, inclusive, computed at coining value. The net yield from 1893 to 1899, inclusive, represents the value of the silver computed at market rates.

MILLIONS LOST IN CARSON RIVER.

When it is considered that the general average of the early milling returns from ores reduced were not over 60 or 65 per cent of the assay value, an approximate idea may be formed of the values left in or carried away by the mill tailings. Vast amounts of the richer and lighter chlorides, as well as quicksilver and amalgam, washed away down the canyons or were deposited by the several great river mills themselves directly into Carson River. Nearly twenty years ago a very responsible and enterprising dredging company of Boston capitalists started in to rescue the \$60,000,000 in Comstock silver and gold thus reputed and computed to have been lost or drowned in that erratic stream. They located 17 miles of it, from the principal mills, at Empire, to away down toward the broad, shallow lake or “sink” in which the river is lost, not altogether by sinking, but by evaporation.

They spent their money freely, and the latest and most efficient patented dredging devices were operated and continued by spells for six or eight years, or until the rich conundrum was given up. Floured quicksilver could be panned or washed out anywhere along the banks, bed, and mud and sand flats of the river, and general assays showed from a few cents to a dollar or more to the ton, but no dredging process could profitably overcome the expense of raising and washing the wilderness of sand, mud, and gravel. It was squarely demonstrated that those Comstock millions surely were and still are in Carson River, but it would cost too many Boston millions to rescue them.

DEEP MINING BELOW THE SUTRO TUNNEL.

Between 1,600 and 1,700 feet vertically below the surface works of the principal deep mining shafts at Virginia City the famous Sutro Tunnel, nearly 4 miles in length, intersects the Comstock lode at right angles, effectually draining all the mines to that depth and furnishing



ENTRANCE TO THE SUTRO TUNNEL.

Sutro Tunnel, nearly four miles in length, from near Carson River, west to base of Mount Davidson and the Comstock Lode.

outlet also for water pumped or raised from lower working levels. In this matter of drainage the tunnel is of great importance, yet in the extraction or transportation of ore it has never been utilized, it being found much more advantageous to hoist the ore to the surface and forward it by railroad to mills along Carson River.

The deepest workings of the Virginia section are in the joint deep winze of the Ophir and Mexican mines, through the Union shaft, 3,300 feet vertical depth, and the combination shaft of the Chollar, Norcross, and Savage Mining companies, 3,260 feet deep. This last-mentioned shaft is the largest and deepest vertical shaft on the lode, the Yellow Jacket shaft, Gold Hill, 3,000 feet vertical, being next. Those deepest explorations developed a few good little deposits, veins and stringers of ore, but no large or dividend-paying bodies were found below the level of the Sutro Tunnel as there were above.

The best promise of a genuine bonanza was on the lowest level of the Belcher mine, Gold Hill, 2,700 feet below the surface, near the south end of the mine. Several strong "feeders" and stringers of ore, rich in black sulphurets of silver and free gold, were met with, evidently converging into a rich body near at hand, when the miners were driven out by an overpowering flow of water coming through the mines north of it. This calamitous flood was tapped by a joint drift of the Alpha and Exchequer mines, being run to open up an extensive body of fair-grade ore found at that point, 2,400 feet below the surface. It effectually drowned out all deep mining in the Gold Hill section, holding full possession ever since; consequently the incipient Belcher bonanza still remains submerged beneath 1,200 feet of hot water. The greatly increasing amount of water in the Virginia section was subsequently found too difficult and expensive to contend with; therefore, by common consent, deep Comstock mining was finally suspended October 13, 1886. It cost nothing to let the water have its own submerging way, and a return to more efficient mining among the old workings of the upper levels, above the Sutro Tunnel, soon gave more prosperous times.

COMSTOCK DIVIDENDS AND ASSESSMENTS.

The subjoined tabular statement "C" summarizes the liberal dividends paid and assessments levied by the various mining companies, from first to last, forming a very interesting exhibit for stockholders to ponder over. The arrangement of this table commences with the Utah mine, at the north end of the lode, the other mines following in adjoining succession southward, through Virginia and Gold Hill to Silver City. The relative positions of the richest producing bonanza mines, as well as the poorest parts of the lode, are also thus comprehensively indicated. The respective numbers of feet given as the length of each mine are official, yet somewhat misleading in the aggregate by reason of some lapping past each other, more or less, a matter considered of no material importance, however, in the general result.

The grand chief bonanza of all, represented in the Consolidated California and Virginia mines, shows nearly \$85,000,000 in dividends against less than \$3,500,000 in assessments. The big Crown Point and Belcher bonanza in the Gold Hill section also shows nearly \$28,000,000 in dividends against less than \$7,000,000 in assessments.

On the other hand, however, comes the Sierra Nevada mine, with \$6,755,910 in assessments against \$102,500 in dividends. And there are others, but the toughest of all is the misnamed Bullion mine, situated upon or beneath the dividing line of Virginia and Gold Hill, right in the middle of the Comstock, which has been run regularly for over thirty years entirely on assessments amounting to \$3,130,000, without yielding a pound of bullion or a ton of pay ore. Yet were it not for the rich mines on both sides it would never have been known or worked at all.

C.—FORTY YEARS OF ASSESSMENTS AND DIVIDENDS.

Name of mine.	Number of feet.	Total amount of assessments.	Total amount of dividends.
Utah Consolidated	1,500	\$485,000	.....
Sierra Nevada.....	4,400	6,755,910	\$102,500
Union Consolidated	1,000	2,660,000	.....
Ophir.....	675	4,652,960	1,592,800
Mexican	600	2,861,360	.....
Consolidated California and Virginia	1,310	3,345,900	84,170,000
Best and Belcher.....	510	2,631,400	.....
Gould and Curry.....	612	4,662,250	3,837,600
Savage	771	7,321,000	4,460,000
Hale and Norcross	400	5,717,480	1,850,000
Chollar	700	2,086,800	750,000
Potosi	700	2,196,400	.....
Bullion	943	3,130,000	.....
Alpha	306	510,000	.....
Exchequer	400	1,020,000	.....
Imperial Consolidated	468	2,226,000	500,000
Challenge Consolidated (including Bowers and next adjoining small mines)	150	440,000	4,800,000
Confidence	130	543,820	204,490
Yellow Jacket.....	1,200	5,824,000	2,184,000
Kentuck.....	90	125,300	1,350,000
Crown Point.....	641	2,990,000	11,903,000
Belcher.....	1,040	3,551,000	15,397,200
Segregated Belcher	1,324	378,000	.....
Overman	1,200	117,280	.....
Caledonia	2,188	3,210,000	.....
Justice	2,100	3,667,250	.....
Alta	600	3,618,110	.....
Silver Hill.....	1,200	2,220,200	.....
Total .....	.....	78,947,420	133,101,590
Excess of dividends over assessments .....	.....	.....	54,154,170

THE SUBMERGED LOWER LEVELS.

During the thirteen years since deep mining was suspended the water gradually rose, filling all the lower levels, shafts, winzes, and other mine openings, until at the first of the present year, 1899, it was up to within 40 feet of the Sutro Tunnel level, all along the lode—about 1,600 feet depth of water. A combination of the principal companies controlling the bonanza of the Virginia section contracted with the Risdon Iron Works Company, of San Francisco, to reduce or pump the water down 500 feet, in order to get at and utilize sundry valuable deposits of good ore supposably known to exist in those submerged levels included.

A powerful hydraulic pump of the latest approved design was furnished, the operating power being supplied by the Virginia and Gold Hill Water Company. It was placed at the 1,750 level or station of the C. and C. shaft of the Consolidated California and Virginia Company, 13 feet above the water surface and 26 feet below the Sutro Tunnel intersection, through which the water was sent out on its way

to Carson River. The pump started working in February and naturally succeeded very well at first, but its action became considerably intermittent, by reason of frequent breakages, or unexpected difficulties with increasing strain and pressure, and the motive power was also found to be inadequate; consequently the water was only reduced about 300 feet during the year, at about which point it will be held till more power and pumps intervene. Meanwhile, the old workings of the drained 1,800 and 1,950 levels are being reopened with renewed explorations, and an effort is being made to drain and reopen the old 2,050 level.

A LONG-SMOLDERING FIRE CALAMITY.

Away back in the middle seventies, about twenty-five years ago, during the time that the immense bonanza deposit of rich ore was being extracted from the Consolidated California and Virginia mines, heavy pine timbers were used as the most available material for filling the extensive chambers or excavations from whence the ore was extracted.

A well-timbered forest of 10 square miles extent, in the Sierra Nevada, south of Truckee River was purchased, sawmills erected, and the timbers, 14 inches square, were brought in by railroad, about 50 miles, and entombed in the heart of the great bonanza, 1,500 feet below the surface. These timbers were piled compactly in place of the ore as fast as removed, thus preventing all cavings of inclosing walls, or vein material.

Seventeen years ago, a miner's candle carelessly left burning, started a fire in some of that old timber filling, causing an immense amount of trouble and expense in long-continued efforts to extinguish it by thorough bulkheading, flooding, and the mechanical injection of large volumes of carbonic-acid gas. But the fire smoldered on, year after year, as was occasionally discovered by new mining drifts incidentally cutting into it. Seven years ago, a drift on the 1,500 level happened to run into the fiery mass, and the hot, fearful gas pouring forth as from the infernal regions, drove all the miners out of the mines, summarily suspending all ore extraction for the time, or until flooding from the levels above and bulkheading the drift had subdued or reconfined the seemingly unconquerable element. Ore extraction was resumed, but not to former extent, and more guarded against similar detrimental experience; in fact, indications of still existing fire were subsequently met with at various times, and it was not considered totally extinguished or exhausted until last March, when it was flooded out by means of the voluminous discharge pipe of the Risdon hydraulic pump, then commencing the drainage of the water from the levels below.

The disastrous fire in the Yellow Jacket, Kentuck, and Crown Point mines, Gold Hill, 1869, smoldered in the timbering for eight years afterwards, before it burned out or was finally extinguished.

COMPRESSED AND MINERALIZED WOOD.

The principal reasons of that fire smoldering for seventeen years in the bosom of the Comstock were the exclusion of atmospheric air and the fuel it had to feed upon, which was simply pine wood compressed into the density of coal, or lignite. During the passing years since that immense amount of timber filling was deposited in the bonanza depths the vast superincumbent mass of ground

forming the foundation of Virginia City has been settling down bodily upon that huge deposit of timbers with irresistible force, crushing and compressing them into less than half their original size.

This has been ascertained by more recent mining operations, in several instances drifting into some of those old filled-in workings that were not affected by the fire. Much of the wood brought to the surface was found compressed to the hardness of mahogany or black walnut, and stained a similar color by the heated gases of those deep, strongly mineralized regions. This wood burns like coal in a stove, bears a very fine polish, and good specimens of it find prominent place in many mineral cabinets.

ELECTRIC POWER SOLVES THE COMSTOCK PROBLEM.

Measures have been taken and a responsible contract is now being actively carried out to bring in an ample and effective supply of electric power for all Comstock mining operations and purposes from Floriston, on the Truckee River, 23 miles above Reno. The six conducting copper wires from Floriston to Virginia will be of one-fourth inch diameter each and 28 miles long, the poles being planted nearly in a straight line between the two points.

Electric energy is to take the place of steam at the various mining and milling works along the lode, and with more powerful and ample facilities than ever, active mining and ore production will be resumed with renewed vigor and encouragement during the coming season. The electric power is scheduled to be delivered and in practical operation by or before the 4th of July, when the old Comstock is expected to enter upon a new, promising, and distinct era of prosperity.

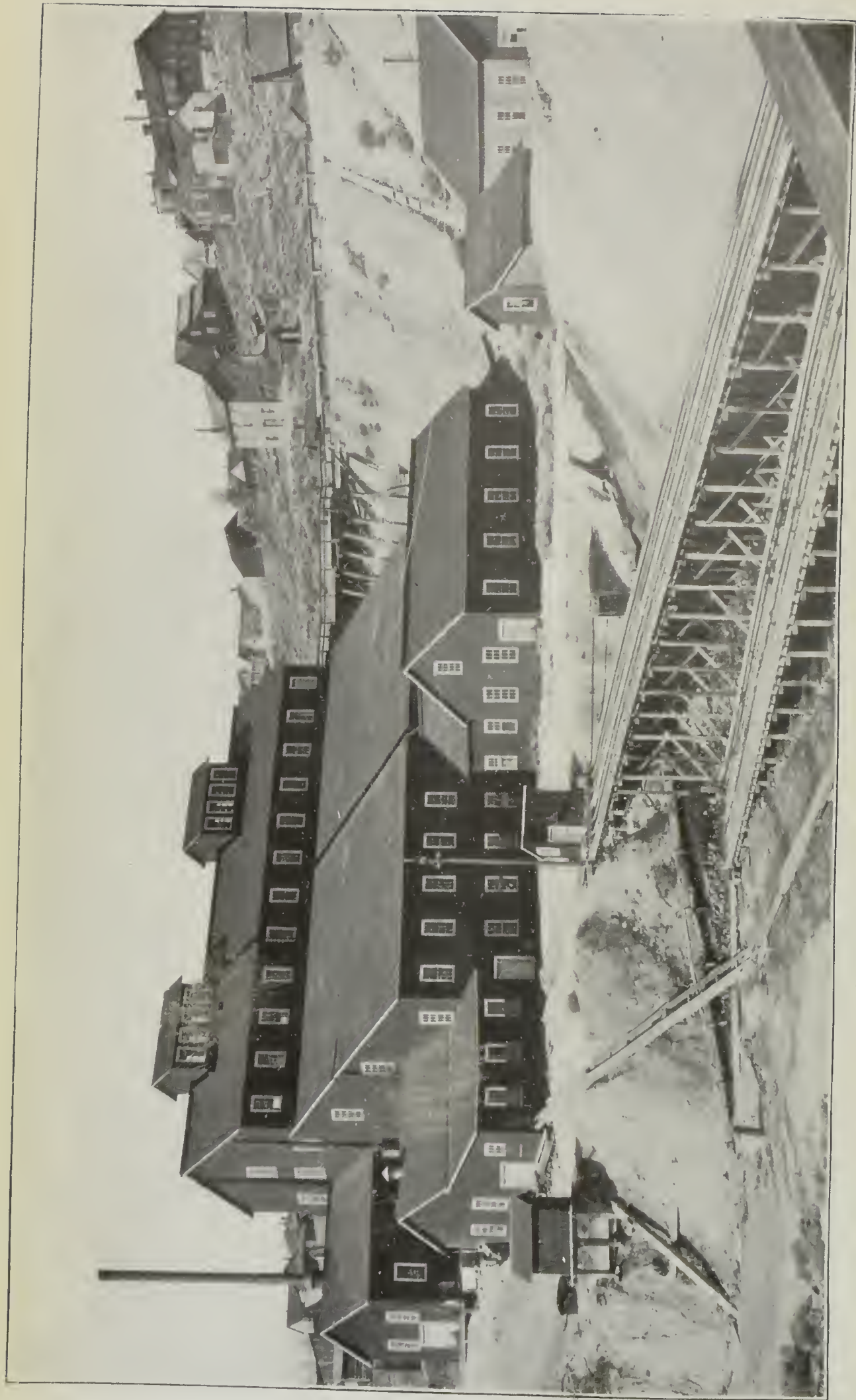
The proposition is to eventually concentrate the deep mining of the Virginia section to three principal points: The combination shaft of the Chollar, Norcross, and Savage companies, the C. and C. shaft of the bonanza group, and the Union shaft, farthest north. The Yellow Jacket and Alta shafts are similarly mentioned for the Gold Hill section deep explorations.

In view of this radical change in the Comstock programme and the requisite changes in the hoisting machinery of the various mining works along the lode, the ore and bullion produced for the year shows a material falling off. Work in the mines is mostly confined to explorations and the opening up of new ore resources in readiness for the new electric power that is expected to bring things out all right.

SURFACE-ORE RESOURCES.

The principal and most eligible of the upper, or surface, levels ore-working propositions is at the Gould and Curry mine, where thousands of tons are easily accessible, assaying an average of \$7.50 per ton, principally gold. It extends from the surface croppings of the ledge on the side of Mount Davidson down to the old lower tunnel, a vertical depth of 425 feet, and at the mouth of the tunnel, which is 2,400 feet in length, a new reduction mill is being placed for working this ore by an improved process.

There are other good surface-ore localities, from Cedar Hill, or the Sierra Nevada mine southward along the lode, yielding insufficient returns in times past, which will also receive renewed investigation as



THE NEVADA MILL, VIRGINIA CITY, NEAR THE CHOLLAR MINE.

Reduction capacity 200 tons of ore per day (60 stamps).



THE KINKEAD QUARTZ MILL, SHOWING 4-MILL PLANT WITH SELF FEEDERS IN OPERATION.
Capacity 40 to 60 tons per day with 10 horsepower.

to their intrinsic merits under the new dispensation. Moreover, it is a demonstrated, well-known fact that with requisite and advantageous mining and milling facilities the whole surface of the workings of the original Gold Hill mines, or mining ground, would pay well for systematic reduction, yielding millions, and giving lucrative employment for capital and labor for many years to come.

All of which established and well understood, low grade ore working propositions involve ample and much cheaper power, with just and reasonable wages for miners, as well as for fewer mining officials, and less expense for milling, transportation, and all else connected, leaving margins for profits without assessments.

THE NEW MILLING PROPOSITIONS.

The chief mill on the lode is the Nevada mill at Virginia, 60 stamps, capable of reducing 160 tons of ore per day, half of which stamps have already been run by electric power and the other half by steam, in years past. And there are others of lesser capacity nearer at hand in the canyons, which will be ready when wanted, without reckoning the river mills. But the most practically important is the one mentioned for working the great reserves of ore in the upper levels of the Gould & Curry, which will be mined and run out through the lower tunnel with the greatest facility, being dumped from the cars directly into the mill.

This new mill is a novelty in its way, well worthy of special mention. It is the invention of James H. Kinkead, superintendent of the Gould & Curry mine, well experienced and successful in Comstock mining and milling. The principle is simple pestle and mortar; a 3,000-pound pestle or muller, gyrating with an easy rotary grinding and crushing movement in a solid iron mortar or pan, the ore pulp passing through a screen in usual wet-milling style and out over amalgamated plates and concentrators. He has been running four of these little gyrators in combination milling on Comstock ore during the last year or two with the most complete success and satisfaction, and the big new mill, or combination, will contain nine of them, working 100 tons of ore per day, more than one-half cheaper and easier than any other mill, giving correspondingly more lucrative returns. This new mill will be completed and start up reducing the ore as soon as the coming electric power strikes the motor.

PRESENT AND FUTURE COMSTOCK OUTLOOK.

The silvery-golden glamour and the dizzy, exciting whirl of tangible or indefinite bullion wealth in the glorious old bonanza days are among the glowing reminiscences of past and fast Comstock history. Of numerous active mining companies along the lode, each had its own hoisting and pumping machinery plant over its shaft, some costing a million or more, being among the best and most powerful in the world. One by one, as mining profits or prospects failed, these expensive plants have been dismantled and the huge steam engines and boilers sold and removed. Old style passes away and steam power gives place to electric energy for future Comstock prosperity.

Many thousands of tons of low-grade gold and silver ore, not only in the surface or upper mine workings, but in the deeply submerged lower levels, await the cheaper mining and milling, and with the advent

of electric power and progress the old Comstock will support a good and flourishing community for many years to come.

Whether new bonanzas as rich and glorious as were the old ones will be brought to light in the renewed workings and undeveloped lower levels is the great problem for the future to solve, but bonanza locations still hold good, and there is plenty of room for more of them.

Sundry depressed periods occurred in years past, when little or no rich ore was in sight, and discouraged workers and managers said, "The bottom has dropped out;" yet rich deposits were soon again run into, giving better returns than ever.

In the language of James G. Fair, the best practical Comstock miner and most thoroughly experienced engineering mine manager and superintendent of them all, who recently died, leaving numerous judiciously earned Comstock millions for his heirs, assigns, and others to wrangle over, "The possibilities of the big old Comstock, my son, are beyond all human calculation."

VIII.

NEW MEXICO.

By CABELL WHITEHEAD, Ph. D.,

Assayer, Bureau of the Mint.

The value of the gold, silver, and lead produced in the Territory of New Mexico during the calendar year 1899 was \$2,225,000, being an increase over the production of 1898 of \$243,988.

This increase was mainly brought about by the work done in the Pinos Altos district, where large concentrating plants have been erected for the treatment of the ores of that district.

The company owning the mines in the district have acquired the smelters located at Silver City, and by improved methods of treatment are enabled to handle ores which a few years ago would have been considered unprofitable.

In the lead camps the production was slightly increased during the past year, but the great activity in the copper market has led to the opening of a large number of copper properties.

At Baline the large cyanide mill has been increased in capacity, until now they are enabled to treat 400 tons of ore per day, and there is every evidence of a largely increased production during the coming year.

The cyanide plant at White Oak is still at work upon the tailings from the milled ores, and have added their quota to the gold production of the Territory.

The value of gold produced from placer mines in New Mexico during the year 1899 was about \$60,000, while that from cyanide works was about \$30,000. The remainder, \$765,200, was derived from quartz and smelting ores.

The copper produced in the Territory during the year 1899 was valued at \$553,849, while the lead production was about \$500,000.

The amount of silver derived from lead ores was about 125,000 ounces, the amount differing very slightly from the production of last year.

The chief change in the conditions existing in the Territory over previous years is the increase in the amount of silver derived from copper ores.

Following is a statement of the output of metals in New Mexico. The values are estimated upon the average New York quotations for the year.

County.	Gold.	Silver.	Lead.	Copper.
	Value.	Commercial value.	Commercial value.	Commercial value.
Bernalillo.....	\$53,760	\$18,147	.....	.....
Colfax.....	97,900	5,700	.....	.....
Donna Ana.....	4,350	6,570	\$4,725	.....
Grant.....	96,740	117,398	398,864	\$525,769
Lincoln.....	49,970	309	.....	28,080
Santa Fe.....	58,800	2,500	.....	.....
Sierra.....	377,000	51,714	.....	.....
Socorro.....	116,680	113,613	96,411	.....
Total.....	855,200	315,951	500,000	553,849

IX.

OREGON.

By FREDERICK A. WING,

Assayer in charge United States assay office, Seattle, Wash.

The values of precious metals and of lead and copper produced in Oregon for the calendar year 1899 show a gain of \$284,186.43 over the production of 1898. Comparative tables attached hereto show the relative gains in each of the metals mentioned:

TABLE No. 1.

Metals.	Quantity.	Value.
Gold.....fine ounces..	70,984.436	\$1,467,378.52
Silver (coinage value).....do....	145,353.51	187,931.80
Copper, at \$17.61 per cwt.....fine pounds..	43,178	7,603.65
Lead, at \$4.47 per cwt.....do.....	86,320	3,858.50
Total		1,666,772.47

TABLE No. 2.

Metals.	1898.		1899.		Increase.
	Quantity.	Value.	Quantity.	Value.	
Gold.....fine ounces..	58,856.381	\$1,216,669.38	70,984.436	\$1,467,378.52	\$250,709.14
Silver.....do....	128,326.17	165,916.66	145,353.51	187,931.80	22,015.14
Copper.....fine pounds..			43,178	7,603.65	7,603.65
Lead.....do.....			86,320	3,858.50	3,858.50
Total		1,382,586.04		1,666,772.47	284,186.43

The counties producing this new wealth are Baker, Grant, Union, Malheur, and Wallowa, in the northeastern portion of the State, while Josephine, Jackson, Curry, Coos, Douglas, and Lane, in the southwestern portion of the State, comprise those furnishing their golden contribution for the year just ended. With the exception of Union, the output from these counties shows a substantial increase, the exception in the case being caused by the closing down of the Cornucopia, which, under ordinary conditions, is the most extensive producer in the county.

BAKER COUNTY.

Over one-third of all the gold and silver finding its way to the mints and assay offices of the United States from the State of Oregon, either by direct deposit or through the medium of smelters and refineries of the country, was recovered from the placer and quartz ledges of Baker

County. Of the total gain of \$284,186.43 in the State's production, this county contributed approximately one-fourth, and in point of intense activity and intelligent progression it ranks first among the State's many valuable mining districts. Sumpter, its principal camp, has become the cynosure of attraction among its many mining men and capitalists. Within the limits of this camp there are at present some twenty mines equipped with stamp mills or cyanide plants which have a total capacity of many thousands of tons of ore per month, while many new properties are constantly being gotten in readiness for active operations.

Herewith is given a partial list of Sumpter mines upon which sufficient development work has been done to place them past the prospective stage. The list is by no means complete, but is prepared from the most reliable data obtainable.

The North Pole mine, on Cracker Creek, just out of Sumpter, is equipped with a 20-stamp mill and a 25-ton cyanide plant, and employs a large force of miners. The lower tunnel is completed for a distance of 1,900 feet, and tunnel No. 2, 450 feet lower, about 1,200. At the intermediate level, 100 feet above No. 2, is a tunnel nearly 700 feet long, and 1,500 feet above this there is still another 800 feet long.

The lower and second tunnels are connected by a main uprise. There are also numerous shafts and raises connecting the different workings, all of which constitute valuable development. A gravity tramway, 1,000 feet long, connects the mouth of tunnel No. 2 with the mouth of the lower. The mine has long been a good producer.

The Golconda, 6 miles from Sumpter, is equipped with a No. 4 Bryan mill of 90 tons daily capacity. About 2,000 feet of tunnel work, 300 feet of shafting, and 200 feet of raises constitute the development work to date. The upper tunnel has reached a depth of 800 feet. The ledge is 160 feet between walls and contains a number of chutes, all of which carry more or less value.

The Columbia, on the same lead as the Golconda, is equipped with two 200-horsepower boilers, a 3-ton hoist, 10 stamps, concentrating tables, sawmill, electric plant, and all necessary machinery.

The E. and E., which is at present idle on account of litigation, is equipped with a 20-stamp mill, concentrating tables, and all modern conveniences. The ledge is 50 feet wide, and the vein has been exploited 1,800 feet, the lowest depth being 60 feet below the apex of the ledge.

The Free Coinage, owned by V. A. Schilling and W. A. Cannon, of Portland, is situated 5 miles from Sumpter. A 100-foot tunnel has attained a depth of 80 feet in ore assaying from \$10 to \$50 per ton in gold. The Ibex, 6 miles from Sumpter, is another big mine in the Cracker Creek district. A total of 1,500 feet of tunneling and shafting represents the development work. The ledge ranges from 10 to 30 feet in width, and the ore will average \$20 per ton in gold.

THE BUNKER HILL.

This group consists of three claims, and is located near the Golconda and Ibex, on the main ledge of that district. It is being thoroughly developed, and the mine is rapidly being brought in line with the other big mines of Sumpter. The property has a 60-foot shaft sunk on the ledge, and at the bottom an 80-foot crosscut has been run, which, how-

ever, has not as yet traversed the ledge. Two tunnels of 150 and 300 feet, respectively, have also been driven, and in these assays run from \$2 to \$24 per ton.

The Maiden's Dream lies parallel to the Ibex ledge and north of it. Development work consists of 1,000 feet of tunnels reaching a depth of 150 feet.

On Burnt River, about 35 miles southeast of Baker City, the Pomeroy Dredger, an extensive plant, has been in operation for some time. It has a capacity of 3,500 cubic yards of gravel per day of twenty-four hours and is operated at a slight cost, not exceeding 5 cents per yard, in gravel running 25 cents. Results so far have been entirely satisfactory. On a tributary of Burnt River the Weatherby placers are located and have been good producers for some time.

There are many other properties in the district in various stages of development, among them being the Baisley Elkhorn, Gold Ridge, Mormon Boy, Consolidated Virginia and Flag Staff Mining Company, Eureka, and Excelsior.

The placer mines of this district also yielded considerable gold, coming principally from the Never Sweat placer mine, Chicken Creek, Rye Valley, Flickbar and Clark creeks.

GRANT COUNTY.

The output of this county in 1898 was \$176,231.82, and for 1899 the production increased to \$303,680.53, showing a net gain of \$127,448.71. The largest production of lead and silver came from this county, and the principal producing mines are located in its extreme eastern portion, lying on the western slope of the Blue Mountains, in the vicinity of Granite, Susanville, Prairie, and Canyon cities. Among these are the Red Boy and Bonanza. This is, strictly speaking, a subdivision of the Sumpter district.

The Bonanza, equipped with a 40-stamp mill, has opened up 10,000 feet of tunnel, is lighted with electricity, and thoroughly equipped in every particular. The ledges, which are cut by 2,500 feet of crosscuts, are from 10 to 135 feet in thickness. Concentrates run as high as \$200 per ton.

The Red Boy is equipped with one of the most complete and modern mills in the State and represents the expenditure of nearly a quarter of a million dollars, employs a large force of men, and the mountain has been penetrated to a depth of 2,000 feet, with a depth of tunnel 400 feet, making it one of the most complete mines in eastern Oregon.

Golden Eagle is another prominent property, while on the Don Juan a 5-stamp mill is operating in high-grade ore. Adjoining the Bonanza on the south is the Empire group of three claims, developed with several hundred feet of tunnel and a 10-stamp mill in process of erection.

Among other mines that are deserving of mention are the Belle View, on which a 10-stamp mill is in operation; Magnolia, which has a 10-stamp mill, with a total of 1,500 feet of tunneling and a large body of ore open up; the Cougar, on which a 250-ton cyanide plant has been installed; May Queen, Little Giant, Pyz, Jay Gould, Banzette, June Bug, Black Bird, and Phoenix.

In the Green Horn district the Diadem, Inter-Mountain, Ben Harrison, Ornament, and Surprise are among the principal properties.

In the Susanville district the greatest amount of work has been

done on the Badger, which has some 2,000 feet of underground work and a 10-stamp mill. The Stockton group is also exposing a body of high-grade ore in its 100-foot shaft.

Thirty miles southwest of Sumpter is the Dixie Butte district, the principal mine being the Copper King, on which 250 feet of tunneling has been done. Ore averages \$14 per ton in copper, the total value being about \$40 per ton.

LANE AND DOUGLAS COUNTIES.

The Bohemia district lies partly in southern Lane and northern Douglas counties, and until within the last year or two was very little known. However, it bids fair to become one of prominence in the near future, on account of the extraordinarily strong and prominent system of fissure veins and its unqualified mining facilities. The great porphyry dikes traversing the district for miles through the andesite formation, the numerous fissure veins that can be readily traced across the entire district, the high altitude attained by some of its peaks, covered with an andesite capping heavily impregnated with iron, all tend to prove its volcanic origin and indicate unusual depth of its many mineralized lodes. From the precipitous nature of the formation, development work can be accomplished by drifting and crosscutting without the heavy cost of hoists, pumps, fans, etc., which are incident to operations in some of the districts in the State.

The production for 1899 shows for Douglas County a gain of \$58,020.27 out of a total of \$64,723.17, while the total amount credited to Lane County is \$42,785.06. The principal mines are the Noon Day, which has a modern 20-stamp mill, 8 Frue vanners, and about 3,500 feet of tram; the Champion, with a 10-stamp mill and a 3,000-foot tram; the Music, with an up-to-date 10-stamp mill, modern machinery, sawmill, etc. The Helena has also produced many tons of very rich ore full of free gold, and has recently installed a new 5-stamp mill. Other properties are the Isabella, Near Glendale, Black Republican and Yankee Boy, and the Laugh.

WALLOWA COUNTY.

In the extreme northeastern corner of the State lies practically a new district, which contains many promising quartz and copper locations. During the year \$4,188.67 in values were produced, derived mostly from the placers along the Snake River.

MALHEUR COUNTY.

The amount of gold and silver credited to Malheur County for the year is \$11,612.51. Of this only a small portion was derived from quartz mining, the major portion coming from placer diggings on Willow Creek, Malheur, and Snake River. Among the quartz properties producing are the Red, White and Blue and the Golden Eagle. The latter property is thoroughly equipped for development, and a large crushing plant is soon to be erected. The development consists of 140 feet of crosscut tunneling, tapping the ore body at 70 feet below the surface, and a shaft 100 feet from surface to the ore body, besides other work of a substantial nature.

UNION COUNTY.

In this county, lying north of Baker, is situated a number of steady producers, and the output for 1899 amounted to \$133,678.22, which, however, is a decrease of \$226,461.55 from 1898. This loss is accounted for by the temporary shutting down of the Cornucopia, which produced the largest amount in 1898 of any one mine in the county.

The properties of the Union Companion, one of the most valuable in the district, consists of some thirty claims, and they have some 10,000 feet of tunnel, crosscuts, shafts, etc., which are located in a milling ore valued from \$14 to \$20 per ton. The mine is equipped with a 20-stamp mill, concentrating tables, air compressor, electricity, etc., and the concentrates go as high as \$200 per ton.

Many other good properties adjoin this mine, and to the west the Faithful Boy, Graphite, Paddy's Paradise, Crown Point, Sanger, and others are located. The Sanger mine is one of the best developed of the group; has a 10-stamp mill in operation, and is a producing property.

JOSEPHINE COUNTY.

The production of this county shows a substantial increase over 1898, \$92,360.06, the total amount produced being \$242,930.15. The operations have been largely confined to the placers of Wolf, Galice, Williams, and other creeks, while some quartz properties, notably the Greenback, Gold Bug, Requitel, and the properties of the Lawrence Mining Company, produced some considerable bullion. The Lawrence is equipped with a 50-ton Griffin mill. Other properties that promise well are those of the Alexander and Bent, on Galice Creek, and those in Silver, Briggs, Soldier, and Althouse districts.

JACKSON COUNTY.

This county shows an increase of \$75,401.81, the total for 1899 being \$106,485.40, partly from its placers of Weimer, Draper, Gold Hill, Steamboat, Sardine Creek, and from its quartz mines, viz, Columbia Gold Milling and Mining Company, McMurtry Mining Company, Shorty Hope mine, and the Oregon Gold Extraction Company at Ashland.

CURRY COUNTY.

Curry County produced \$10,465.21 for the calendar year just ended, principally from its placers in the Sixes mining district and the Johnson district.

COOS COUNTY.

Coos County contributed \$17,803.79, an increase of \$15,710.77 over 1898, largely secured from the placers of Randolph and others, and is indicative of increased activity. The only quartz mines of note in the county are those on the Devilbliss property, where there is a 5-stamp mill in operation, and the properties at the head of the small tributary of Johnsons Creek.

PRODUCTION OF GOLD AND SILVER IN OREGON DURING THE CALENDAR YEAR 1899.

Counties.	Gold.		Silver.		Total.
	Fine ounces.	Value.	Fine ounces.	Coinage value.	
Baker	28,171.068	\$582,347.65	42,862.72	\$55,418.47	\$637,766.12
Coos	850.000	17,571.06	180.00	232.73	17,803.79
Curry	500.000	10,335.92	100.00	129.29	10,465.21
Douglas	3,068.000	63,421.19	1,007.00	1,301.98	64,723.17
Grant	10,500.000	217,054.27	67,000.00	86,626.26	303,680.53
Jackson	5,005.000	103,462.53	2,338.00	3,022.87	106,485.40
Josephine	11,413.000	235,927.65	5,416.00	7,002.50	242,930.15
Malheur	555.000	11,472.87	108.00	139.64	11,612.51
Lane	2,015.000	41,653.75	875.00	1,131.31	42,785.06
Union	5,525.000	114,211.88	15,056.00	19,466.34	133,678.22
Wallowa	200.000	4,134.37	42.00	54.30	4,188.67
Returns from custom smelters, mints, and assay offices impos- sible to classify by counties....	3,182.368	65,785.38	10,368.79	13,406.11	79,191.49
Total	70,984.436	1,467,378.52	145,353.51	187,931.80	1,655,310.32

PRODUCTION OF GOLD AND SILVER IN OREGON (ORIGIN DETAILED) DURING THE CALENDAR YEAR 1899.

Origin.	Gold.		Silver.		Total.
	Fine ounces.	Value.	Fine ounces.	Coinage value.	
Placer bullion	13,887.000	\$287,065.77	2,722.00	\$3,519.35	\$290,589.12
Mill bullion	30,954.000	639,875.97	13,904.00	17,976.89	657,852.86
Copper ores	10.000	206.71	2,000.00	2,585.86	2,792.57
Lead ores			50,000.00	64,646.46	64,646.46
Dry ores and concentrates, classified as smelting ores....	26,133.436	540,226.07	76,727.51	99,203.24	639,429.31
Total	70,984.436	1,467,378.52	145,353.51	187,931.80	1,655,310.32

BULLION OF OREGON PRODUCTION DEPOSITED AT THE UNITED STATES MINTS AND ASSAY OFFICES DURING THE CALENDAR YEAR 1899.

Institutions.	Gold.		Silver.		Total value.
	Standard ounces.	Value.	Standard ounces.	Coinage value.	
Mints:					
San Francisco	7,227.802	\$134,470.73	1,356.88	\$1,578.91	\$136,049.64
Philadelphia	183.689	3,417.47	8.93	10.39	3,427.86
Assay offices:					
Boise	36,898.982	686,492.69	12,886.07	14,994.70	701,487.39
Denver	36.948	687.40	3.74	4.35	691.75
Helena	411.616	7,657.97	91.71	106.72	7,764.69
Seattle	96.072	1,787.39	10.91	12.69	1,800.08
Total	44,855.109	834,513.65	14,358.24	16,707.76	851,221.41

DISPOSITION OF GOLD AND SILVER OF OREGON PRODUCTION DURING THE CALENDAR YEAR 1899.

Disposition.	Gold.		Silver.		Total value.
	Fine ounces.	Value.	Fine ounces.	Coinage value.	
Deposited at the United States mints and assay offices	40,369.598	\$834,513.65	12,922.41	\$16,707.76	\$851,221.41
Shipped to custom smelters and refineries by producers	30,614.838	632,864.87	132,431.10	171,224.04	804,088.91
Total	70,984.436	1,467,378.52	145,353.51	187,931.80	1,655,310.32

X.

SOUTH APPALACHIAN STATES.

By W. S. CLANTON,

Assayer in charge of the United States assay office at Charlotte, N. C.

The output of precious metals in the South Appalachian States in 1899 was, in fine ounces, 22,679.398, and in coinage value \$340,535.04, as exhibited in detail in Tables 1, 1a, and 1b, showing a decrease, as compared with 1898, of \$4,616.24.

The yield of Alabama was slightly decreased, that of Georgia notably less, while the production of North Carolina fell back substantially to the figures of the years prior to 1898.

Maryland, Virginia, and Tennessee slightly increased their production. In South Carolina the yield was increased nearly 52 per cent.

The deposits at the various mints and assay offices of the United States, officially reported to this office, were \$321,417.86, which comprises a little more than 94 per cent of the total production of the region.

A relatively large quantity of shipping ores were sent to smelting works from Virginia and North Carolina, and are evidently increasing in amount.

A classification according to immediate sources of production is given in Table 2 in coining values, and summarized in Table 3.

A comparison with the like statement for 1898 shows an increased amount in placer production, a greatly decreased amount in mill returns, a notable increase in the output of works and river mining, and a very considerable increase in shipping ores, the unidentified production being about the same.

The output from works was mainly due to chlorination establishments.

The Blacksburg (S. C.) Sulphuric Acid Works was closed and the Fritz-Honeycutt plant accomplished but little. On the other hand, a large and important smelting plant was installed and made ready for business February 1, 1900, at Oakdale, 9 miles from Atlanta, viz, the Southern Smelting Company. A fine mill and chlorination works has been erected at Dahlonega. Otherwise there have been no important changes. I am not aware of any cyaniding beyond mere experiments. Old and tried methods were adhered to, and, on the whole, mining was in a fairly satisfactory condition at the close of the year.

MARYLAND.

The returns of this State are exhibited in Tables 4, 4a, and 4b. As in preceding years, the entire amount came from the casual work of Montgomery County, and there appears no prospect of any more extended work in 1900.

VIRGINIA.

Tables 5, 5a, and 5b indicate localities and amounts. No mines were worked systematically for the direct production of gold and silver, but the copper belt, in Halifax County, extending northeast from Virginia to the Hyco River, was prospected with some care, especially around High Hill, where 16 shafts and pits were sunk, with half as many more on the Chapel vein to the east and perhaps a dozen pits on the western parallel vein on the Overby and its southern extensions. Hardly a pit failed to disclose valuable ore bodies, varying in width from 18 inches to 5 feet, which are generally found at the very grass roots. These bodies carry very high-grade copper ores, malachite, azurite, bornite, and copper glance, rarely yellow copper ores.

The greatest depth reached in this county was at High Hill, in November, 1899, viz, 116 feet, at which depth the vein showed satisfactorily, both in width and contents. Entire shipments were made ranging from 11.95 to 25.83 per cent copper, with a trace of gold and 0.40 to 6 ounces of silver. The continuation of this belt southwest into North Carolina, into Granville and Person counties, will be found in the notes of that State.

This county, with the adjacent counties of North Carolina, in the southwestern extension of the belt, will add something to the resources of the region in the direct line of the present subject.

Apart from the possibilities of this belt, I see no occasion for expecting any important changes in Virginia in 1900.

NORTH CAROLINA.

The yield is tabulated in 6a and 6b. The falling off of nearly one-half is almost entirely due to the lessened production of Gold Hill, Rowan County, and especially to the cessation of the work at the Fritz-Honeycutt, but most of the counties in the State show a decrease, and only five show an increase, relatively small, viz, Franklin, Granville, Montgomery, Nash, and Stanley.

The Mann-Arrington, in Nash County, was put to work the latter part of the spring; the Portis, at Ransoms Bridge, in Franklin County, worked a part of the year fitfully.

The work in Guilford County nearly ceased. The Snipes mine, in Chatham County, spent the entire year in purely development work, as did the Aldrich, in Randolph.

In Cherokee County no change was reported in the character of the work.

In Davidson county the Silver Hill mine was reopened by the West Prussian Mining Company, and some shipments of argentiferous and auriferous blende and galenite were made. This ore is exceedingly refractory, and there is no establishment in this section which can deal with such material.

It is reported that the near-by Silver Valley mine, with ores of like character, will soon be reopened.

The only mines at work in Mecklenburg County, the very center of this mining section, were the Surface Hill, the Grier, the Summerville, and the Black Cat, the latter only being equipped with reducing machinery. A considerable reserve of rich ore has been opened up at the Grier.

The Beaver Dam and the Tebe Saunders, in Montgomery County, and the Fesperman and Crawford, in Stanley, have shown only a little of the activity which made them noted in past years.

At the Union Copper Mining Company, in Rowan County, the work has been prosecuted with great energy and with a most lavish expenditure in preparing the working plant. Some hundreds of tons of auriferous copper ore of the higher grades, incidentally extracted, were shipped to smelting works, and a large dump of low-grade ore was accumulated for subsequent operations.

The company has been reticent in its operations, and little exact information is accessible to the public.

There is known to be at command a large amount of low-grade yellow copper ore, with small contents of gold and silver.

A large concentrating plant has been erected, preliminary to the erection of a smelter. Its first work was done in March, 1900.

The operations are primarily smelting for copper, but any systematic work should provide for the extraction of the small contents in gold and silver, and to that extent their work comes within the purview of this inquiry. This enterprise is hopeful.

The same company has arranged to open the old Gold Hill mine (i. e., the Randolph and Barnhardt veins), which has been the largest producer of gold in the past in the State. This mine is known still to have reserves of auriferous sulphurets, with only a small copper content.

The McMakin mine, near by, is operated by a Pittsburg company. The whole of 1899 was spent in sinking and drifting, and 1900 will probably be spent in the same manner. Large masses of low-grade sulphurets have been exposed.

The mining work in Caldwell, Catawba, and Gaston counties was unimportant.

The work in Burke, Rutherford, and Polk, was confined almost entirely to placers.

A dredging plant has been installed on the Catawba River, between Gaston and Mecklenburg counties, viz, the Catawba Placer Mining Company, and did its first work early in May, 1900. It has secured rights from Tuckasege Ford southward for more than 6 miles, to a point a little south of Walkers Ferry. This space has from time immemorial received the tailings from numerous mines in Catawba, Lincoln, Gaston, and Mecklenburg counties, and is popularly believed to contain a large store in its bed. The dredge is similar to others employed in this and other sections, and is substantially a scoop, or dipper dredge, with a companion scow provided with ordinary arrangements for saving gold.

The belt alluded to in the notes for Halifax County, Va., extends southwestwardly into Granville and Person counties, N. C.

Four mines are worked—the Blue Wing (170 feet deep) and the Holloway (416 feet deep), in Granville, and the Copper World and Thornton Yancey, in Person. From the Blue Wing and Holloway more than 2,000 tons, mostly high-grade ores, were shipped in 1899, and both mines are in condition to continue shipments. The Copper World and Yancey will probably be shippers in 1900 of high-grade copper glance.

SOUTH CAROLINA.

The production is shown in Tables 7a and 7b. The great increase in production in 1899 (\$55,012.89) was due mainly to the Haile mine, in Lancaster County; but the Blackmon mine, in the same county, and the Douglas, in Spartanburg, added materially to swell the returns, the Haile steadily developing its resources ahead of its present wants, and had at command in 1899 a better grade of ore. Its admirable management continues, and the methods are steadily perfected and cheapened. Nothing of importance is to be added to the statement of former years about this mine.

The Brewer mine, in Chesterfield, was operated by small parties only.

The Douglas mine, in Spartanburg County, was put to work late in the year, but is in a condition to produce steadily in 1900.

The work in South Carolina is in a highly satisfactory condition for steady production in 1900, and I see no reason for any notable change.

GEORGIA.

The activity in 1899 was even greater than in 1898, but the output was less—i. e., \$117,682.70 against \$134,626.88 in 1898. The statistics are given in Tables 8a and 8b. In most of the counties, except White, the yield was materially decreased.

In Rabun, Cobb, Dawson, Dekalb, Elbert, Forsyth, Lincoln, Gwinnett, Meriwether, Towns, Walton, and Union only placer work was undertaken.

In Carroll County the Southern Development Company and some smaller companies were active most of the year. In Hall County the activity was mostly confined to the Currihee and the Marion mines and to dredge mining.

The Morgan mine, in Oglethorpe County, was only slightly operated.

In Paulding County the Taylor was worked the latter part of the year, and in Warren County the Cadley during the earlier part.

In White County seven mines were operated, the Alexandrine, Glen Comyn, Gold Reefs of Georgia, Loud, Santee, Mount Yonah, and Nacoochee Hills, the chief activity being displayed at the Gold Reefs of Georgia and at the Loud. Nearly one-third of the entire production of the county was from placer mining.

In McDuffie County the mines at work were the Walker, the Columbia, and the Tatham. The first, an old and productive mine, was spasmodically operated and the latter two only prospected.

The Cherokee mine, in Cherokee County, and the Creighton were very actively at work during the year, with very satisfactory results, and the condition of these mines warrants equally good results in 1900.

The Sixes, a mine near Canton, was prospected the earlier part of the year. This mine in the past has had a good record.

LUMPKIN COUNTY.

This county, next to Cherokee, was the largest producer. Twelve mines, including two dredging plants, were actively in operation, viz, the Betz, Burns, Dahlonega Consolidated Gold Mining Company, Dahlonega Gold Mining Company, the Ivy, the Kentucky, Lumpkin

Gold Mining Company, Street, Tahloneka Gold Mining Company, the Tahloneka Lease Company, the Birch Brothers., River Mining Company, and the Sheppard River Mining Company.

The small and incidental placer mining amounted to a little more than 40 per cent of the entire return of this county.

The feverish activity and speculation shown in this county the last three years has greatly diminished, and the work performed in 1899 was of a very substantial character.

The great work has been accomplished by the Dahlongega Consolidated Gold Mining Company, which has entirely rearranged its system, changed the course of its water supply, established new reservoirs, and erected a new mill and chlorination works. Five hundred men are reported to have been employed in construction works in 1899, and large dumps of ore have been accumulated ready for treatment.

If successful, it will occasion a marked change in the nature of mining work in this and the adjacent counties, and stimulate new enterprises.

The dredge-mining operations of Georgia have assumed considerable importance the last five years, and among them is the plant of Birch Brothers, on the Chestatee River, near Newbridge. Some novel features of work have been introduced, among others the treatment of the river bank above and below water. Five photographs are made a part of this report, showing the dredge in operation and the shoals, which impede navigation, and the mode of surmounting the obstructions.

No reliable prediction can be made of the production for 1900, but the amount of mining work will evidently be large.

ALABAMA.

For details of production, see Tables 9*a* and 9*b*. There was a still further falling off of production in 1899. The statement made for 1898 may be repeated almost verbatim for 1899, and there is no evidence of increased interest for 1900.

TENNESSEE.

The production as shown in 10*a* and 10*b*, was entirely from placer work in the Coker Creek neighborhood, in Monroe.

TABLE 1A.—STATISTICS OF PRODUCTION OF THE PRECIOUS METALS IN THE APPALACHIAN STATES IN 1899.

SUMMARY FOR ALL THE STATES.

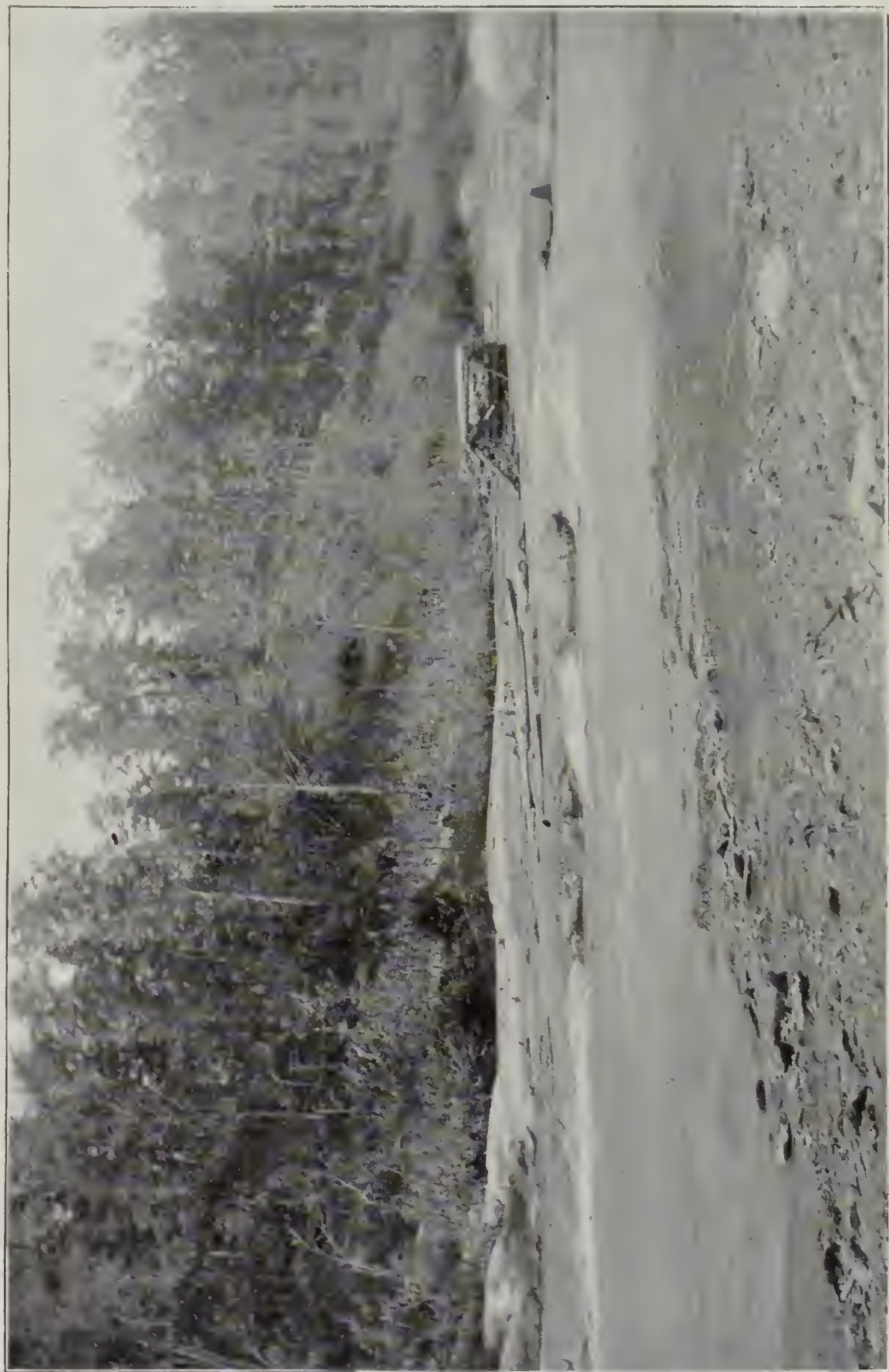
States.	Gold.		Silver.		Total value.
	Weight.	Value.	Weight.	Coining value.	
	<i>Fine ounces.</i>	<i>Dollars.</i>	<i>Fine ounces.</i>	<i>Dollars.</i>	<i>Dollars.</i>
Alabama	230.571	4,766.32	49.84	64.44	4,830.76
Georgia	5,665.022	117,106.40	445.73	576.30	117,682.70
Maryland	56.734	1,172.80	2.58	3.34	1,176.14
North Carolina	1,969.485	40,712.85	5,529.38	7,149.09	47,861.94
South Carolina	7,755.088	160,311.88	402.47	520.37	160,832.25
Tennessee	8.536	176.46	.86	1.12	177.58
Virginia	373.892	7,729.04	189.21	244.63	7,973.67
Total	16,059.328	331,975.75	6,620.07	8,559.29	340,535.04



DREDGE HANDLING 30 FEET OF PERPENDICULAR MATERIAL, OF WHICH 17 FEET WAS ABOVE THE SURFACE AND 13 FEET BELOW WATER, RUNNING THE ENTIRE MATERIAL OVER SLUICES.



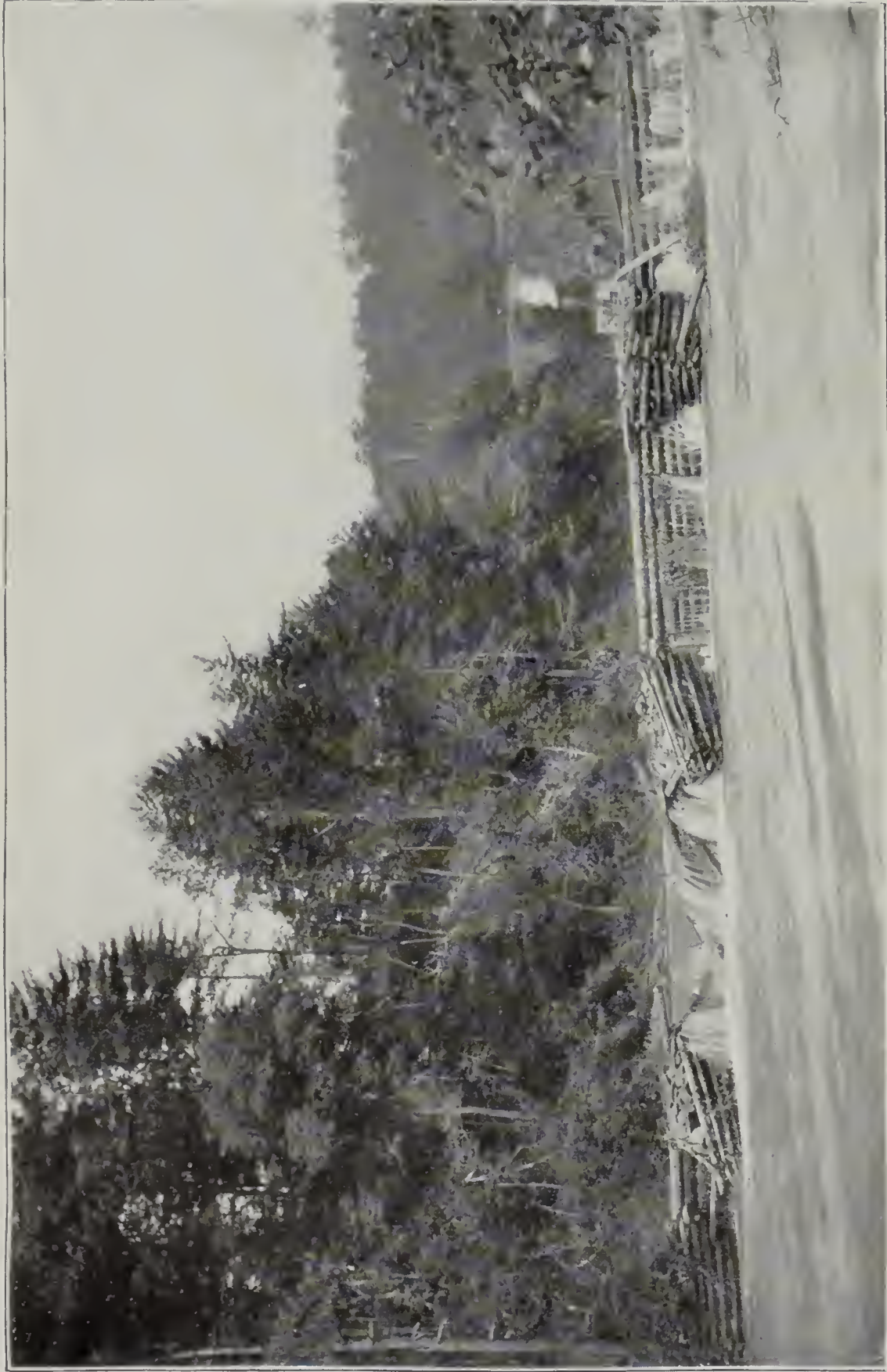
THREE-QUARTER VIEW OF DREDGE BOAT, WITH SLUICES ON THE SIDE.



BULL SHOALS ON THE CHESTATEE RIVER.



MILL SHOALS ON THE CHESTATEE RIVER.



DAM TO RAISE WATER FOR FLOATING OVER GRIFFEY SHOALS.

TABLE 2A.—IMMEDIATE SOURCES OF PRECIOUS METALS OBTAINED IN 1899.

[Coining values.]

States.	Placers.		Mills.		Works.		River mining.	
	Gold.	Silver.	Gold.	Silver.	Gold.	Silver.	Gold.	Silver.
Alabama.....	\$3,783.44	\$45.97	\$11.94	\$0.12				
Georgia.....	36,027.11	190.52	50,957.01	258.15	\$12,989.76		\$11,016.58	\$26.95
Maryland.....			1,172.80	3.34				
North Carolina.....	26,473.14	279.07	4,981.02	98.27	3,000.54	\$5.91		
South Carolina.....	4,078.44	42.29	81,186.49	473.49	75,009.74	4.12		
Tennessee.....	176.46	1.12						
Virginia.....	3,492.43	7.17	3,626.74	10.06				
Total.....	74,031.02	566.14	141,936.00	843.43	91,000.04	10.03	11,016.58	26.95

TABLE 2B.—IMMEDIATE SOURCES OF PRECIOUS METALS OBTAINED IN 1899.

[Coining values.]

States.	Shipping ores.		Untraceable.		Totals.		Grand total.
	Gold.	Silver.	Gold.	Silver.	Gold.	Silver.	
Alabama.....			\$770.94	\$18.35	\$4,766.32	\$64.44	\$4,830.76
Georgia.....			6,115.94	100.68	117,106.40	576.30	117,682.70
Maryland.....					1,172.80	3.34	1,176.14
North Carolina.....	\$3,416.98	\$6,722.19	2,841.17	43.65	40,712.85	7,149.09	47,861.94
South Carolina.....			37.21	.47	160,311.88	520.37	160,832.25
Tennessee.....					176.46	1.12	177.58
Virginia.....	64.38	227.14	545.49	.26	7,729.04	244.63	7,973.67
Total.....	3,481.36	6,949.33	10,510.75	163.41	331,975.75	8,559.29	340,535.04

TABLE 3.—SUMMARY OF MODES OF PRODUCTION IN SOUTH APPALACHIAN STATES IN 1899.

Modes.	Gold.	Silver (coining value).	Total.
Placers.....	\$74,031.02	\$566.14	\$74,597.16
Mills.....	141,936.00	843.43	142,779.43
Works.....	91,000.04	10.03	91,010.07
River mining.....	11,016.58	26.95	11,043.53
Shipping ores.....	3,481.36	6,949.33	10,430.69
Untraceable.....	10,510.75	163.41	10,674.16
Total.....	331,975.75	8,559.29	340,535.04

COUNTIES OF PRODUCTION OF THE PRECIOUS METALS IN THE APPALACHIAN STATES IN 1899.

TABLE 4A.—MARYLAND.

County.	Gold.		Silver.		Total value.
	Weight.	Value.	Weight.	Coining value.	
	<i>Fine ounces.</i>	<i>Dollars.</i>	<i>Fine ounces.</i>	<i>Dollars.</i>	<i>Dollars.</i>
Montgomery.....	56.734	1,172.80	2.58	3.34	1,176.14
Total.....	56.734	1,172.80	2.58	3.34	1,176.14

TABLE 5A.—VIRGINIA.

Counties.	Gold.		Silver.		Total value.
	Weight.	Value.	Weight.	Coining value.	
	<i>Fine ounces.</i>	<i>Dollars.</i>	<i>Fine ounces.</i>	<i>Dollars.</i>	<i>Dollars.</i>
Culpeper	18.476	381.93	.87	1.13	383.06
Fauquier	71.962	1,487.59	4.38	5.66	1,493.25
Fluvania	27.968	578.16	.96	1.24	579.40
Goochland	10.021	207.14	.14	.17	207.31
Halifax	3.114	64.37	175.70	227.16	291.53
Loudoun	137.533	2,843.08	1.74	2.26	2,845.34
Spottsylvania	78.430	1,621.28	5.22	6.75	1,628.03
Untraceable	26.388	545.49	.20	.26	545.75
Total	373.892	7,729.04	189.21	244.63	7,973.67

TABLE 6A.—NORTH CAROLINA.

Counties.	Gold.		Silver.		Total value.
	Weight.	Value.	Weight.	Coining value.	
	<i>Fine ounces.</i>	<i>Dollars.</i>	<i>Fine ounces.</i>	<i>Dollars.</i>	<i>Dollars.</i>
Burke	390.281	8,067.83	69.50	89.85	8,157.68
Cabarrus	58.772	1,214.92	6.76	8.74	1,223.66
Caldwell	9.816	202.92	2.30	2.98	205.90
Catawba	10.896	225.25	2.20	2.85	228.10
Cherokee	19.598	405.14	2.39	3.10	408.24
Cleveland	3.752	77.56	.50	.64	78.20
Davidson	45.024	930.74	2,093.98	2,707.36	3,638.10
Franklin	118.879	2,457.43	11.37	14.71	2,472.14
Gaston	28.021	579.24	1.51	1.95	581.19
Granville	48.980	1,012.50	1,075.01	1,389.91	2,402.41
Guilford	11.578	239.33	4.80	6.20	245.53
Iredell	5.879	121.54	.....	.....	121.54
Lincoln	2.994	61.90	.13	.17	62.07
McDowell	140.593	2,906.31	31.74	41.04	2,947.35
Mecklenburg	51.329	1,061.06	4.05	5.24	1,066.30
Montgomery	211.942	4,381.23	23.35	30.18	4,411.41
Moore	5.550	114.74	2.07	2.68	117.42
Nash	66.297	1,370.47	21.72	28.08	1,398.55
Polk	26.043	538.36	2.28	2.94	541.30
Randolph	34.701	717.34	6.56	8.48	725.82
Rowan	317.100	6,555.01	2,070.79	2,677.40	9,232.41
Rutherford	69.364	1,433.88	13.79	17.83	1,451.71
Stanley	106.188	2,195.10	34.46	44.56	2,239.66
Union	48.466	1,001.88	14.36	18.55	1,020.43
Untraceable	137.442	2,841.17	33.76	43.65	2,884.82
Total	1,969.485	40,712.85	5,529.38	7,149.09	47,861.94

TABLE 7A.—SOUTH CAROLINA.

Counties.	Gold.		Silver.		Total value.
	Weight.	Value.	Weight.	Coining value.	
	<i>Fine ounces.</i>	<i>Dollars.</i>	<i>Fine ounces.</i>	<i>Dollars.</i>	<i>Dollars.</i>
Abbeville	46.801	967.46	19.57	25.31	992.77
Cherokee	14.864	307.28	1.31	1.69	308.97
Chesterfield	168.528	3,483.78	15.14	19.57	3,503.35
Lancaster	7,438.968	153,777.12	345.59	446.83	154,223.95
Pickens	2.983	61.65	.25	.32	61.97
Spartanburg	57.496	1,188.54	11.17	14.44	1,202.98
Union	23.648	488.84	9.08	11.74	500.58
Untraceable	1.800	37.21	.36	.47	37.68
Total	7,755.088	160,311.88	402.47	520.37	160,832.25

TABLE 8A.—GEORGIA.

Counties.	Gold.		Silver.		Total value.
	Weight.	Value.	Weight.	Coining value.	
	<i>Fine ounces.</i>	<i>Dollars.</i>	<i>Fine ounces.</i>	<i>Dollars.</i>	<i>Dollars.</i>
Carroll.....	256.341	5,299.03	14.93	19.30	5,318.33
Cherokee.....	1,787.900	36,959.19	27.58	35.65	36,994.84
Cobb.....	31.725	655.81	2.09	2.71	658.52
Dawson.....	189.002	3,907.01	11.37	14.68	3,921.69
Dekalb.....	3.675	75.96	.19	.24	76.20
Elbert.....	1.356	28.04	.05	.06	28.10
Forsyth.....	123.281	2,548.45	.44	.57	2,549.02
Gwinnett.....	15.852	327.70	7.18	9.29	336.99
Hall.....	177.797	3,675.39	34.73	44.90	3,720.29
Lincoln.....	.849	17.54	.07	.09	17.63
Lumpkin.....	1,483.009	30,656.53	122.98	159.02	30,815.55
McDuffie.....	251.054	5,189.75	28.83	37.28	5,227.03
Meriwether.....	11.790	243.72	5.33	6.89	250.61
Oglethorpe.....	49.138	1,015.78	5.30	6.86	1,022.64
Paulding.....	44.284	915.42	2.76	3.57	918.99
Rabun.....	13.456	278.16	.50	.64	278.80
Towns.....	1.057	21.86	.05	.07	21.93
Walton.....	17.039	352.22	2.00	2.59	354.81
Warren.....	9.976	206.21	2.31	2.99	209.20
White.....	892.824	18,456.32	99.17	128.22	18,584.54
Union.....	7.758	160.37	.....	.....	160.37
Untraceable.....	295.859	6,115.94	77.87	100.68	6,216.62
Total.....	5,665.022	117,106.40	445.73	576.30	117,682.70

TABLE 9A.—ALABAMA.

Counties.	Gold.		Silver.		Total value.
	Weight.	Value.	Weight.	Coining value.	
	<i>Fine ounces.</i>	<i>Dollars.</i>	<i>Fine ounces.</i>	<i>Dollars.</i>	<i>Dollars.</i>
Clay.....	8.537	176.48	1.69	2.19	178.67
Cleburne.....	58.428	1,207.81	10.97	14.18	1,221.99
Tallapoosa.....	116.637	2,411.09	22.99	29.72	2,440.81
Untraceable.....	46.969	970.94	14.19	18.35	989.29
Total.....	230.571	4,766.32	49.84	64.44	4,830.76

TABLE 10A.—TENNESSEE.

County.	Gold.		Silver.		Total value.
	Weight.	Value.	Weight.	Coining value.	
	<i>Fine ounces.</i>	<i>Dollars.</i>	<i>Fine ounces.</i>	<i>Dollars.</i>	<i>Dollars.</i>
Monroe.....	8.536	176.46	0.86	1.12	177.58
Total.....	8.536	176.46	0.86	1.12	177.58

XI.

SOUTH DAKOTA.

By FRANKLIN R. CARPENTER, M. A., Ph. D.,

Mining and Metallurgical Engineer.

Not all the gold and silver shipped from South Dakota in the form of matte is mined there. The smelting company buys the copper ores for smelting in Montana, and the gold and silver which they carry has been excluded from my report.

The output was somewhat lessened by the burning of the Golden Reward Company's chlorination mill last August. There are in course of erection several mills for the treatment of ores too low in grade to pay for smelting.

The Homestake Company is building what is probably the largest cyanide mill ever erected for the further treatment of the tailings from their mills. They have also built an expensive pumping plant upon the Spearfish Creek, which will greatly increase their water supply and thereby enable them to increase their gold output.

The Caledonia and De Smet mills have long been closed. It is thought that the increased water supply will enable them to run also. If so, a very great increase in gold from the free-milling belt may be expected hereafter.

Other free-milling sections in the central and southern hills are being developed.

SOUTH DAKOTA'S GOLD AND SILVER OUTPUT FOR 1899.

Description.	Market value.	
	Silver.	Gold.
Free-milling	\$5, 380. 66	\$3, 856, 686. 30

NONFREE-MILLING ORE TREATED BY MILLS AND SMELTERS.

	Tons.
Treated in South Dakota	171, 150
Shipped to Omaha, Kansas City, etc.	8, 875
Total tons mined	180, 025

VALUE.

Silver (market value)	\$106, 214. 75
Gold (coin value)	2, 610, 362. 50
Gold (coin value), all other sources	4, 000. 00

TOTAL OUTPUT.

Gold	\$6, 471, 048. 80
Silver (market value)	111, 595. 35



WINZE ON 1,200-FOOT LEVEL, ANCHOR MINE, PARK CITY, UTAH.

XII.

UTAH.

By EUGENE B. BRADEN,

Assayer in charge, United States Assay Office, Helena, Mont.

The precious metal mining industry of Utah during 1899 shows largely increased values over the preceding years. Below are the figures of this production:

Description.	Quantity.	Value (coin- ing rate).
Gold.....fine ounces..	169,630.888	\$3,506,581.66
Silver.....do....	7,183,107.21	9,287,249.72
Copper, at \$16.67 per hundredweight.....fine pounds..	9,310,344	1,552,034.34
Lead, at \$4.47 per hundredweight.....do....	87,707,343	3,920,518.23
Total		18,266,383.95

The following table exhibits the increased production of each metal over the output for the preceding year:

Metal.	1898.		1899.		Increase.
	Quantity.	Value.	Quantity.	Value.	
Gold.....fine ounces..	114,767	\$2,372,442	169,631	\$3,506,582	\$1,134,140
Silver.....do....	6,570,256	8,494,876	7,183,107	9,287,250	792,374
Copper.....fine pounds..	5,191,542	624,543	9,310,344	1,552,034	927,491
Lead.....do....	83,660,727	3,162,375	87,707,343	3,920,518	758,143
Total		14,654,236		18,266,384	3,612,148

Mining in Utah is thus shown to be in an attractive condition. The above improvement has been characteristic of recent years. The silver-lead feature of the industry continues to play a leading part, and the cyanide process hereafter will have a necessary place in the maintenance of the present output of gold. The year also witnessed the completion and opening of a smelting plant for the treatment of low-grade copper ores. Of the foregoing it may be said, geographically, that the Park City and the Tintic are the more distinctly silver-lead producing districts; that Mercur is the center of the cyanide treatment of ores; and that Bingham is the camp from which the large quantities of low-grade copper ores are taken. In 1899, however, an important amount of copper came from the Tintic district, some of which was contained as a by-product in both lead and gold bearing ores.

The gold that was won from Utah ores in 1898 and 1899 originated

among the several divisions of the crude products in the amounts shown by the following comparisons:

Description.	1898.		1899.		Increase.
	Fine ounces.	Value.	Fine ounces.	Value.	
In quartz and dry ores	4,398.574	\$90,926.59	14,693.951	\$303,750.92	\$212,824.33
In cyanides.....	56,207.900	1,161,920.41	101,214.609	2,092,291.66	930,371.25
In lead ores	42,053.752	869,328.21	27,642.931	571,430.10	a 297,898.11
In copper ores.....	2,046.735	42,309.77	14,469.427	299,109.60	256,799.83
In milling ores.....	10,059.930	207,957.21	11,609.970	239,999.38	32,042.17
Total	114,766.891	2,372,442.19	169,630.888	3,506,581.66	1,134,139.47

a Decrease.

The total increase of gold was more than 43 per cent over the yield of 1898. Of this, the amount of gain from quartz and dry ores was due to a larger extraction from and sale of this product by the mines in the Tintic district. The heavy increase in the value of gold extracted by means of the cyanide process was due to a further perfection during the year of the process and appliances at the Mercur mills. From what has been accomplished the future treatment of a larger tonnage from the extensive ore bodies at this camp is assured.

The yield of gold from this source will be maintained and very likely further increased hereafter.

The decrease of the gold contained in lead ores was due partly to a lessened value per ton of this metal in the ores themselves and partly to the manufacture of doré bars by the milling and concentration of much of the lower grade lead ore. The gold thus obtained from lead ores milled is included under the head of milling ores. The largely favorable showing of gold derived from the copper ores during the year was owing to the Highland Boy smelter having been put into commission in May. This plant was erected to handle the low-grade copper ores from the company's properties at Bingham. The mining of cupriferous ores in the Tintic district was also heavier in 1899 than for some years past. No gold in any appreciable amount was taken from placers in Utah during 1899.

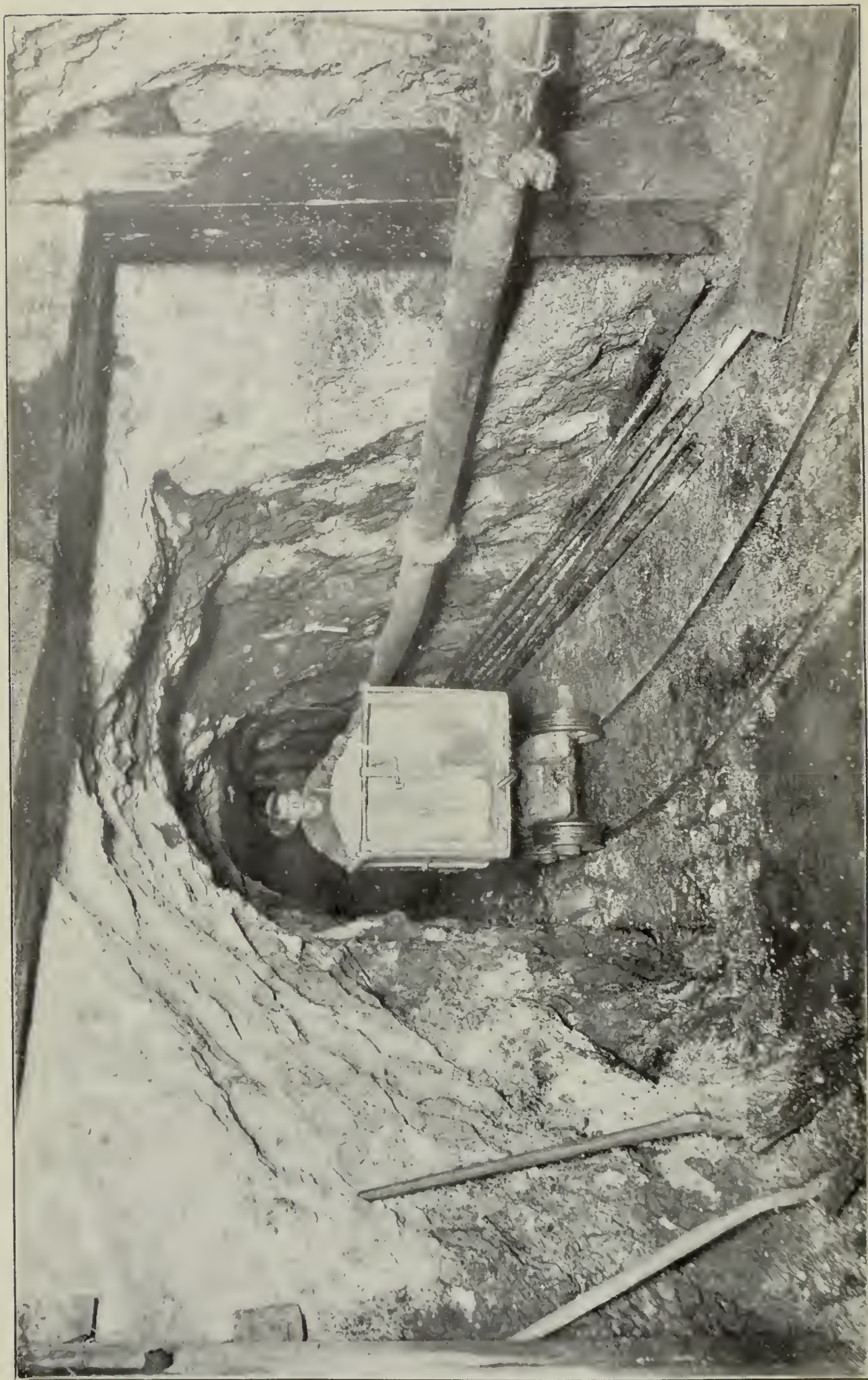
The amount of silver originating from lead and copper ores, from cyanides and milling plants, and that contained in dry ores and concentrates during the year is shown below:

Description.	Fine ounces.	Coining value.
In lead ores	5,028,660.22	\$6,501,702.09
In copper ores.....	611,745.33	790,943.46
In cyanides	82,537.21	106,714.78
In quartz and dry ores.....	297,185.69	384,240.09
In milling ores.....	1,162,978.76	1,503,649.30
Total.....	7,183,107.21	9,287,249.72

The silver originating in lead ores was contained in the shipments of this product to various custom smelters for treatment. These originated principally from the mines of the Tintic region and Park City. Considerable argentiferous lead ore was also secured from the mines at Frisco and at Bingham. The silver won from copper ores was contained in the product from Bingham and Eureka. Outside of the operations of the Chloride Point Consolidated Mining and Milling



SURVEYING ON 1,400-FOOT LEVEL, DALY-WEST MINE, PARK CITY, UTAH.



ONTARIO NO. 2 DRAIN TUNNEL, NEARLY FOUR MILES LONG, PARK CITY, UTAH.

Company, at Mercur, the silver values won by the operations of cyanide plants were unimportant and played but a small part in the output of the State.

The silver obtained from the dry ores and concentrates is also of lesser importance, and was contained in shipments from Eureka, Mercur, and Frisco. The silver won from the various mills was obtained principally from lead-bearing ores, treated in the mills at Park City, Eureka, Mammoth, and Silver Reef. This was shipped as doré bars for final treatment to the various refineries of the East.

The output of gold from Utah originates in Beaver, Juab, Salt Lake, Summit, and Tooele counties. The products for 1898 and 1899 were as follows:

Counties.	1898.		1899.		Increase (+) or decrease (-).
	Fine ounces.	Value.	Fine ounces.	Value.	
Beaver	719.733	\$14,878.20	1,083.716	\$32,738.31	+ \$17,860.11
Carbon	250	5,167.96	.....	.....	- 5,167.96
Iron	290	5,994.83	.....	.....	- 5,994.83
Juab	38,136.264	788,346.55	44,917.386	918,188.86	+ 129,842.31
Salt Lake	9,913.186	204,923.74	8,611.380	178,013.03	- 26,910.71
Summit	6,439.094	133,107.88	8,803.797	181,990.63	+ 48,882.75
Tooele	55,841.371	1,154,343.59	106,214.609	2,195,650.83	+1,041,307.24
Unclassified by counties	3,177.243	65,679.44	.....	.....	- 65,679.44
Total	114,766.891	2,372,442.19	169,630.888	3,506,581.66	+1,134,139.47

The increase shown for Juab County is explained by the more active operations at and extraction of ore from several of the largest properties in the Tintic district, notably the Centennial Eureka, Grand Central, and Mammoth mines. The increase from Summit County was due to a larger mining and reduction of the silver-lead ores from Park City district by the Silver King, Ontario, Daly-West, and Anchor properties. The large and important increase of gold taken from Tooele County in 1899 was due to the successful operations at Mercur, where the cyanide process made rapid advancement in the treatment of the low grades of that camp. It is believed that the present production of gold will be still further increased in this county and a large output will be maintained for a number of years. The output of gold from Salt Lake and Beaver counties shows little or no increase of importance from that of the preceding year. No gold has been reported as produced by either Carbon or Iron counties during 1899.

The amounts of silver originating in the several counties in 1899, when compared with the corresponding figures for 1898, show the following results:

Counties.	1898.		1899.		Increase (+) or decrease (-).
	Fine ounces.	Value.	Fine ounces.	Value.	
Beaver	309,986	\$400,789.98	244,939	\$316,688.80	- \$84,101.18
Carbon	200	258.59	.....	.....	- 258.59
Iron	2,510	3,245.25	.....	.....	- 3,245.25
Juab	3,389,507.16	4,382,393.09	3,329,833.10	4,305,238.73	- 77,154.36
Salt Lake	381,476.49	493,222.13	201,801.44	260,914.97	- 232,307.16
Summit	2,215,496.24	2,864,479.98	3,152,329.78	4,075,739.49	+1,211,259.51
Tooele	125,865.56	162,735.27	225,705.01	291,820.72	+ 129,085.45
Washington .....	.....	.....	28,498.88	36,847.01	+ 36,847.01
Unclassified by counties	145,214.05	187,751.50	.....	.....	- 187,751.50
Total	6,570,255.50	8,494,875.79	7,183,107.21	9,287,249.72	+ 792,373.93

There is seen to be but little change in the output except in Salt Lake, Summit, and Tooele counties. The decrease in Salt Lake County was due to several of the producers of silver at Bingham in the past being comparatively idle pending their consolidation into one corporation. In Summit County the large increase was due to the resumption of production by the Daly-West mine and mill, the more extensive extraction and treatment of ores from the Ontario mine, and greater tonnage taken from the Silver King properties during the year.

BEAVER COUNTY.

The precious metal contents of ore mined in this county during 1899 were as follows:

Description.	Quantity.	Value.
Gold.....fine ounces..	1,083.716	\$32,738.32
Silver (coining value).....do....	244,939	316,688.80
Copper (at \$16.67 per cwt.).....fine pounds..	918,292	153,079.28
Lead (at \$4.47 per cwt.).....do....	4,983,453	222,760.35
Total.....		725,266.75

A large portion of the above output comes from Frisco, where is located the historic Horn Silver mine. This was opened nearly thirty years ago, and has since produced over \$30,000,000 in precious metals, and paid more than five and one-fourth million dollars in dividends. The property has been extensively developed, the lead standing in a nearly vertical position, and is from 30 to 100 feet wide between the walls.

The main shaft has been sunk to water level, a distance of 1,600 feet, and the ledge opened about 5,500 feet on the strike. The character of the ore varies from the surface to the seventh level, lead carbonates carrying silver, gold, copper, and zinc being found. At greater depth this becomes more of a copper and zinc sulphide associated with considerable galena. It was in the upper workings of the mine that a large tonnage of chloride of silver (horn silver) was obtained, from which fact the mine derived its name. The property is equipped with 30 stamps, besides necessary crushers, rolls, jigs, and vanners, to reduce about 150 tons of ore per day to concentrates for shipment. The property is one that seems to have a long period of operations before it for the future, with increased production over that of the last few years. Besides the Horn Silver are a number of mines in process of development in the vicinity of Frisco, and should this work all result satisfactorily the output of the county will be largely increased hereafter.

JUAB COUNTY.

The values won from ores mined in this county in 1899 were as follows:

Description.	Quantity.	Value.
Gold.....fine ounces..	44,917.386	\$918,188.86
Silver (coining value).....do....	3,329,833.10	4,305,238.73
Copper (at \$16.67 per cwt.).....fine pounds..	3,441,677	573,727.56
Lead (at \$4.47 per cwt.).....do....	38,080,904	1,702,216.41
Total.....		7,499,371.56

The increase in value during 1899 over that of the precious metals extracted because of mining operations carried on in this county in 1898 is nearly \$1,000,000. The activity in mining arises from the districts centered about Eureka, Mammoth, Silver City, and Diamond. The more important mines of this county are the Eureka Hill, Humbug-Uncle Sam, Swansea, South Swansea, Fortune, Centennial-Eureka, Bullion Beck and Champion, Grand Central, Mammoth, Gemini, Godiva, Ajax, and Showers Consolidated. These properties were all at work in 1899, the output and conditions varying slightly from those in 1898. The most notable increase in output was that of the Centennial-Eureka, due to a more extensive extraction and reduction of ores from that mine. Nearly all of the properties produce lead in considerable quantities, while at several the amount of copper contained in the ore is quite heavy. This is especially true of the Grand Central and Centennial-Eureka mines.

In point of the number of men employed in mining and the tonnage of ores mined and importance of the properties, this district (Tintic) ranks first in Utah. The value of the metals extracted in Juab County is also greater than of any other county in the State.

SALT LAKE COUNTY.

The values of the precious-metal contents taken from the ores produced by the mines of this county in 1899 were as follows:

Description.	Quantity.	Value.
Gold.....fine ounces..	8,611.360	\$178,013.03
Silver.....do.....	201,801.44	260,914.97
Copper (at \$16.67 per cwt.).....fine pounds..	4,145,028	690,976.17
Lead (at \$4.47 per cwt.).....do.....	2,334,731	104,362.48
Total		1,234,266.65

This is a comparatively small decrease in value from that of the yield of metals by this county in 1898. The chief district in point of mining activity is at Bingham, where the Highland Boy, Old Jordan and Galena, Old Telegraph, Butterfield, Last Chance, Petro, and other mines are located. The characteristic of many of the ores from this camp is a low percentage of copper contained in the ores. Of this product large bodies exist at Bingham, and much thought and money have been expended in the past that successful methods might be devised for the profitable handling of these ores. As a result of these efforts the Highland Boy Smelter has been erected near Salt Lake City, to treat the product from the mine of that name at Bingham. The methods therein employed are believed to have successfully solved the problem presented in these ores. This smelter was put into commission in May, 1899, and has since been steadily at work.

Incidental to the development of the camp at Bingham and the erection of the Highland Boy smelter was the consolidation of a number of claims at this point into several large companies. The result sought was the more economical handling of these ores, and seems to have been accomplished.

Besides the Bingham district in Salt Lake County are the Big Cottonwood, Little Cottonwood, and Alta. The production from these districts in 1898 was small.

SUMMIT COUNTY.

The metals taken from ores mined in Summit County during 1899 were as follows:

Description.	Quantity.	Value.
Gold.....fine ounces..	8,803.797	\$181,990.63
Silver (coining value).....do....	3,152,329.78	4,075,739.49
Copper (at \$16.67 per cwt.).....fine pounds..	805,347	134,251.34
Lead (at \$4.47 per cwt.).....do....	41,884,755	1,872,248.55
Total.....		6,264,230.01

The above total is an increase in the value of the metal output by the mines of this county of more than \$2,000,000, thus showing the increase to have been the greatest of any in the State during 1899.

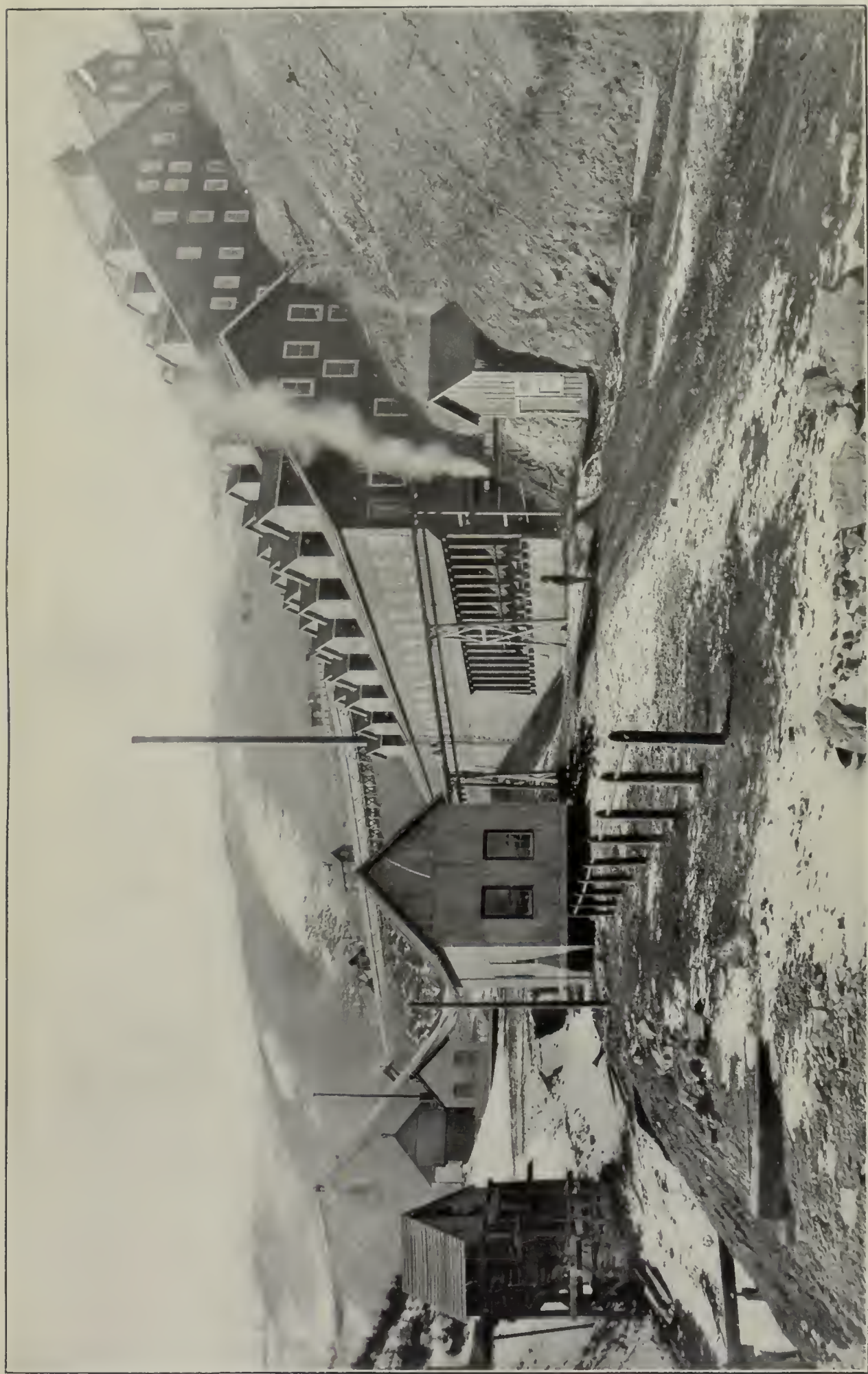
The scene of the most active operations is at Park City, where the large properties of the Ontario, Silver King, Daly, Daly-West, and Anchor companies are located. In point of production during 1899 the operations conducted at and the output from the Silver King mine were the most important at Park City, the values, tonnage of ore, and number of men employed at this property being greater than at any of the others. The Silver King is also one of the greatest dividend payers at the present time in the State of Utah. The ore reserves in the mine are extensive and the promise for the future is very bright.

This company in 1898 commenced the erection of a large concentrator plant to handle their lower grade of ore. This was put into commission during the year 1899 with the most satisfactory results, it being one of the most modern and complete plants of its kind in the West.

The Ontario mine, also at Park City, was for many years the leader among Utah mines. The aggregate of dividends paid by this company to date has been nearly \$14,000,000. Of recent years limited operations have been carried on at the Ontario, and the mining of ores on an extensive scale has been suspended. However, during the past year the work was increased and total values of the metals obtained from their ores show a considerable growth.

Another property at Park City that came forward with a largely renewed production was the Daly-West mine. The showing made as a result of the year's operations is most creditable. The control of the mine near the close of the year passed into new hands, who promise that the output is to be heavily increased in the immediate future. The ore reserves in this mine are stated to be among the largest in the West.

All of the above mines are producers of silver-lead ores, a portion of which is treated by milling and concentration at Park City, the balance being shipped to the smelters for reduction. Besides the mines noted a property situated near Park City that came into prominence during 1899 as a producer was the Valeo mine. The character of its ores differs from those of the other properties in Summit County. Instead of carrying lead, copper is associated with the gold and silver. The production from Park City last year now makes Summit County the second in importance in the State and a close rival for first place.



SILVER KING CONCENTRATING MILL, PARK CITY, UTAH.



TOOELE COUNTY.

The quantities and values of the gold and silver taken from the ores mined and treated in this county during 1899 were as follows:

Description.	Quantity.	Value.
Gold.....fine ounces..	106, 214. 609	\$2, 195, 650. 83
Silver (coining value) do....	225, 705. 01	291, 820. 72
Total.....		2, 487, 471. 55

The above values come from the district at and around Mercur, where nearly all the ore mined is treated by the cyanide process. In view of what has been accomplished during the past few years in the working of the enormous bodies of low-grade ores that underlie this camp, the following description and history of Captain De La Mar's mines and Golden Gate Mill, at Mercur, together with the processes now used, has been written for this report by Mr. D. C. Jacklin. Mr. Jacklin to-day ranks as the leading expert on the cyanide process in the United States, if not in the world. He was in charge as general superintendent of the De La Mar mines and mills for their purchase by the present owner, and it has been to his energy and skill that the present plant and methods were evolved and adapted for the profitable treatment of the ores at Mercur. The following is the first time a description has been written by anyone connected with this plant, and is especially valuable because of its authoritative origin. Mr. Jacklin says:

The most notable increase in the gold production of Utah is due to the extensive operations of De La Mar's Mercur mines, in the Mercur district, which at the present time are producing more than one-third of the total tonnage of the entire camp. The nucleus of this great property, consisting of 143 acres, called the Golden Gate Group, by which name the property is still locally known, was purchased by Capt. J. R. De La Mar, in 1895. This gentleman, with his characteristic well-directed energy, began immediate developments on an extensive scale, and in a short time was so well pleased with his initial purchase that he began acquiring surrounding territory and continued to do so until the fall of 1897, by which time the area of the group had been increased to over 800 acres.

At the time of De La Mar's first purchase the values from the ores of the district were being successfully extracted by the cyanide process, but the major part of the ores developed in the De La Mar property were of a very different character from those coming from different other mines in operation, and were so refractory, from various causes, that the method of coarse crushing and direct cyaniding then in vogue in the mills of the camp was entirely unsuited for their treatment, as had been clearly demonstrated by the disastrous effects resulting from even small amounts of this "base" ore, which was being occasionally encountered in small quantities in some of the other mines, getting into their tank charges and entirely reversing otherwise satisfactory results.

The Mercur ores in general can not be characterized specifically with regard to their physical or chemical composition for the reason that they are made up of widely varying proportions of several distinct varieties of gold-bearing material, viz, a very fine grained, minutely fractured, and extremely tough, hard quartz; a silicious limestone, also highly fractured; a compact ferruginous clay, and small quantities of decomposed porphyry. These varieties of rock occur singly and mixed in all proportions. The values in the quartz and limestone lie largely in the numerous fracture seams; in the clays and porphyries they are very uniformly disseminated throughout the mass, and this class of ore is usually of higher grade than the others. Locally, the ores are classified into three varieties, according to their mode of treatment:

First, "oxidized ores," consisting of a mixture in which the calcareous and silicious varieties predominate and in which the proportion of clay and talc is insufficient to interfere with percolation.

This class of ore contains only an insignificant quantity of compounds of base elements, showing only very small fractional percentages of mercury, as cinnabar and arsenic oxidized compounds.

Second, "talc ores," which are almost entirely clay and talc, and soft, decomposed porphyry. These ores, like the class above, are almost free from base element compounds, but impossible of percolation, for the reason that on contact with water they disintegrate and settle to an almost impervious mass.

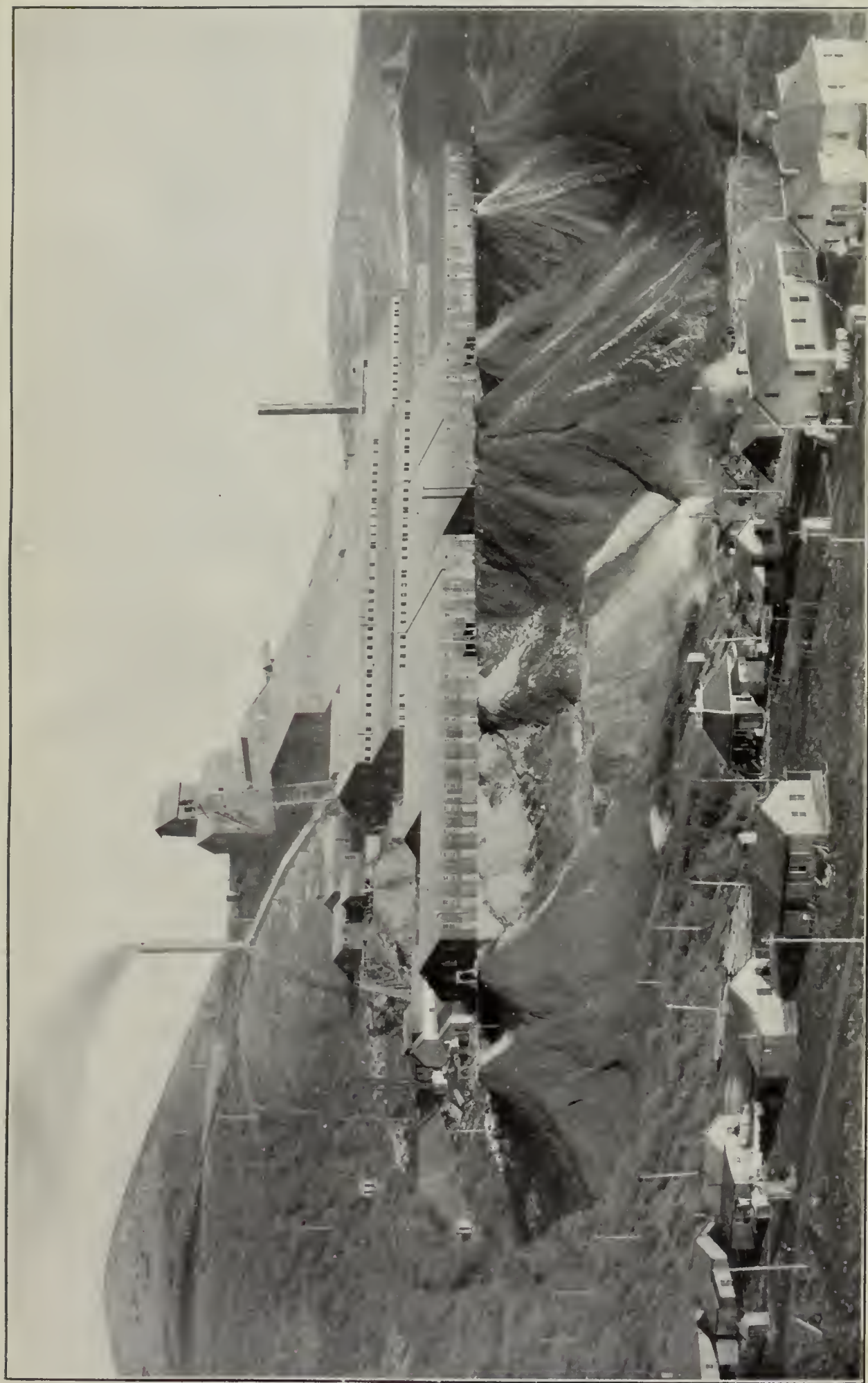
Third, "base ores," consisting of a mixture of the above classes, with the calcareous and talcose varieties predominating, and containing large quantities of base metal sulphides. Arsenic is the chief of these, occurring as realgar, orpiment, and mispickel, in quantities sometimes as high as 50 per cent, but averaging not to exceed 2 per cent. Realgar is by far the most plentiful of the arsenic-bearing minerals, fully three-fourths of the arsenic appearing in this way. Antimony is present as stibnite. Occasional small quantities of galena occur.

Considerable quantities of iron pyrites are frequently encountered in minute crystals. Mercury is invariably present, but in less quantities than in the oxidized ores. Various hydrous sulphates of iron are present, as well as oxidization products of arsenic, both simple and in combination with lime and magnesia. Some of the rarer elements, most notably tellurium, are also present, in traces only. The clays of this class of ore are invariably dark gray or black in color, due to a considerable quantity of carbon, frequently as much as 4 per cent, and in these are sometimes found organic compounds which decompose potassium cyanide very rapidly. Silver is very sparingly distributed in all classes of ore, rarely exceeding 1 ounce of silver to 10 ounces of gold. No metallic gold is visible in any of the ores until after they have been roasted, when occasional minute, irregular particles may be discovered under the microscope. All the clean, base minerals are invariably poorer in gold than the gangue with which they are associated. The clear crystals of realgar and orpiment carry none at all, or only traces, showing that the increased values of the base ore are not directly due to these base-metal minerals. The gold in whatever ore found dissolves very rapidly and completely in solutions of potassium cyanide, indicating that it is very finely divided in whatever condition it occurs, and these various facts have led me to the conclusion that the gold in these ores is present in a finely divided, amorphous, metallic state, having the black or brown color characteristic of the metal when in this condition, and consequently being unrecognizable under the microscope in its naturally occurring state.

Early in the development of the De La Mar properties, it was apparent that the larger proportion of the ores were of the base or talcose varieties above described, and which were at that time being left in the other mines when encountered, so that it became necessary to devise a plan for their successful treatment, and to this end laboratory experiments were begun immediately after the purchase of the properties in 1895, and continued into the spring of 1896, at which time sufficient data had been obtained to convince all concerned that the vexing problem would be solved along the lines followed in the laboratory work, and in May, 1896, an experimental plant to demonstrate these results on a larger scale was completed. This plant, capable of treating 5 tons of ore at a time, was equipped with complete crushing, roasting, leaching, and precipitating machinery, so arranged that the details of treatment could be varied widely, and after continuous operation for nearly a year, and the expenditure of many thousands of dollars in equipment and investigation, it was closed down, having served its purpose in demonstrating that the refractory ores of the Mercur district could be successfully treated by the methods hereinafter described, and almost immediately afterwards (July, 1897) ground was broken for the erection of the magnificent plant which has now been in successful operation for over two years.

The mill is built in eight levels on the hillside above the mines, having a slope of 20 degrees. It has been enlarged twice since the completion of the original design in March, 1898, and will be described as it is at present.

The highest level is occupied by a steel ore bin, having a capacity of 2,500 tons, on top of which is erected a steel gallows frame, carrying the hoisting cables from the mine to the power house. Above the ore bins is also located the coarse crushing machinery, consisting of two No. 6, style D, Gates crushers. Into these the ore is dumped over grizzlies direct from the skips, and passing through the crushers, falls into the storage bin below. The ore is delivered to the mill by 3-ton skips, running in balance direct from the mine through 300 feet of vertical and 400 feet of inclined shaft, and thence over 200 feet of inclined steel bridging connecting the mouth of the incline from the mine with the top of the gallows frame. The hoisting is done by a double drum electric hoist, situated 100 feet up the hill back of the gallows frame and main storage bin.



GOLDEN GATE MILL, MERCUR, UTAH.



STRAIGHT-LINE FURNACE. GOLDEN GATE MILL, MERCUR, UTAH.

The next section below contains the necessary drying machinery, consisting of two straight-line driers, with hearths 60 feet long by 12 feet wide, and two revolving cylindrical driers 7 feet in diameter at the discharge end and 30 feet long. The third level contains the fine crushing machinery, screens, and elevators required to finish the crushing of the ore to the necessary fineness, and deliver it to the steel-finished ore storage bin of 3,000 tons capacity, also located on this level. The machinery of this section consists of 4 sets of 15 by 36 inch and 5 sets of 15 by 26 inch Gates high grade rolls; nine 24 inches by 8 feet Berthelot separating screens; four 48 inches by 8 feet revolving hexagonal screens; six 12-inch elevators, and two motors, one of 150 horsepower and one of 100 horsepower, giving the necessary power for driving the machinery of this and the drying section.

The next section, embracing three levels, contains the roasting and calcining machinery, consisting of nine straight-line furnaces, each with a roasting hearth 100 feet long and 12 feet wide. Three of these are of the Jacklin pattern, two are Holtoff-Wethey, and the four others were originally built according to the Brown designs, but have been entirely reconstructed and made to correspond with the Jacklin pattern as far as possible, being supplied with Jacklin mechanical parts throughout.

The next section contains the leaching tanks, 26 in number, each 25 feet wide, 50 feet long, and 5 feet deep, and having a capacity of 260 tons. Adjacent to and above this level are 3 solution standardizing tanks, having a combined capacity of 500 tons of solution. The next and last section contains 3 precipitating tanks, having a combined capacity of 100 tons of solution; 2 gold-solution tanks, holding 300 tons, and 1 barren-solution sump tank, holding 150 tons; 9 Stilwell-Bierce and Smith-Vails all-iron filter presses, distance-frame pattern, each having 36 sections 24 inches square; 2 600-gallon cycloidal, belt-driven pumps, and a 10-horsepower belt-driven air compressor. The plant throughout is driven by electrical power derived from the Provo River, 37 miles distant. The current is transmitted by the three-phase system over three No. 5 bare copper wires, at a pressure of 40,000 volts, to the substation near the upper part of the mill, where it is transformed to a tension of 220 volts for use by Westinghouse type C, two-phase induction motors, and distributed for power and light purposes for the mill and mine at this pressure. There are in use for every purpose 20 motors, ranging in size from 10 to 150 horsepower, and giving for all uses the utmost satisfaction and requiring a surprisingly small amount of attention and repair. In stormy weather there has been considerable difficulty and delay occasioned by the breaking down of the long-distance transmission system, and to overcome these delays in the future an 800 horsepower steam-generating plant at the mill is just being completed. The plant is equipped with complete and commodious shops in which all the repairing and manufacturing work required about the place is done, with the exception of making castings, which are purchased in the rough. The extreme length of the mill through the leaching department, the longest section, is 720 feet along the face of the hill, with a width up the hill of 500 feet, measured on the natural slope. The immensity of the plant can be better understood from the fact that the single floor space covered by the main and adjunct building is something over 3 acres. The total surface area necessary for the accommodation of the entire plant is nearly 10 acres. The buildings are steel throughout, with the exception of the power-house and refinery, which are brick, with corrugated iron roofs. The tanks and ore bins are also of steel, there being no wood anywhere in the plant, except where it was desirable to use heavy timbers rather than steel for machine foundations.

The ores are roughly graded in the mine into the three classes above described, viz, "oxidized," "talcy" (or as it is called at the works, "mixed"), and "base," and these classes are kept separate until the furnaces are passed, when they are all mixed together to go to the leaching tanks.

In order to keep the three classes of ore separate the crushing machinery is necessarily arranged in three series, and both the large storage bins divided into three compartments. The crushers are so arranged that two classes of ore can be taken through either of them, but the rolls are operated each series for one class only. The crushers are set so that everything passing through them will pass a 2-inch ring. From the coarsely crushed ore storage bin the ore is automatically fed to the driers, and by them discharged to the heads of Berthelot screens, the fines going direct to the elevators, which discharge them into their proper finished ore bin compartment. The coarse ore passes a set of large rolls, set with their faces about one-half inch apart, to another inclined screen, where the fines are again removed, the rejections passing on through the small rolls, which are kept set face to face. From the small rolls the ore passes to elevators and is elevated to revolving screens over the finished ore bin. From these screens the fines drop directly into the bin and the rejections are returned to the small rolls for further reduction. It is seldom necessary to oper-

ate the driers, as the ore as it comes from the mine, except at unusually wet seasons, can be rolled and screened to the proper fineness without previous drying. On this account belt conveyors have been provided above the driers to convey ore from the coarse ore bin to the rolls when it is necessary to dry it. These also work entirely automatically. On account of using both inclined and revolving types of screens it is not possible to get an absolutely uniform product, but it is intended to finish the oxidized ores so that they will pass a 3-mesh No. 16 wire cloth, the talcose or mixed to pass a 4-mesh No. 16 wire, and the base an 8-mesh No. 16 wire. About 90 per cent of the pulp will pass these sizes, the remaining 10 per cent of slightly coarser material having gone through the inclined screens, the mesh of which is necessarily coarser than the product desired, on account of the inclined position of the cloth.

From the finished ore bin the oxidized ore is ready to go direct to the leaching tanks, the base and mixed classes going to the roasting and calcining furnaces. The four furnaces nearest the bins are automatically fed from it by means of an elevator discharging into a small hopper connected by a 6-inch standard pipe to each of the furnace automatic feeding hoppers. It is worthy of mention that all spouts in the mill are 6-inch or 8-inch standard black pipe, and that they serve the purpose admirably from the fact that they are dustless, seldom clog, and when worn on one side can be turned one-third way over, thus affording three new wearing surfaces for one spout, and avoiding the troublesome operation of frequent repairing. The other five furnaces are automatically fed by two belt conveyers, one conveyer supplying two furnaces and the other, which is over 200 feet long, supplying the other three.

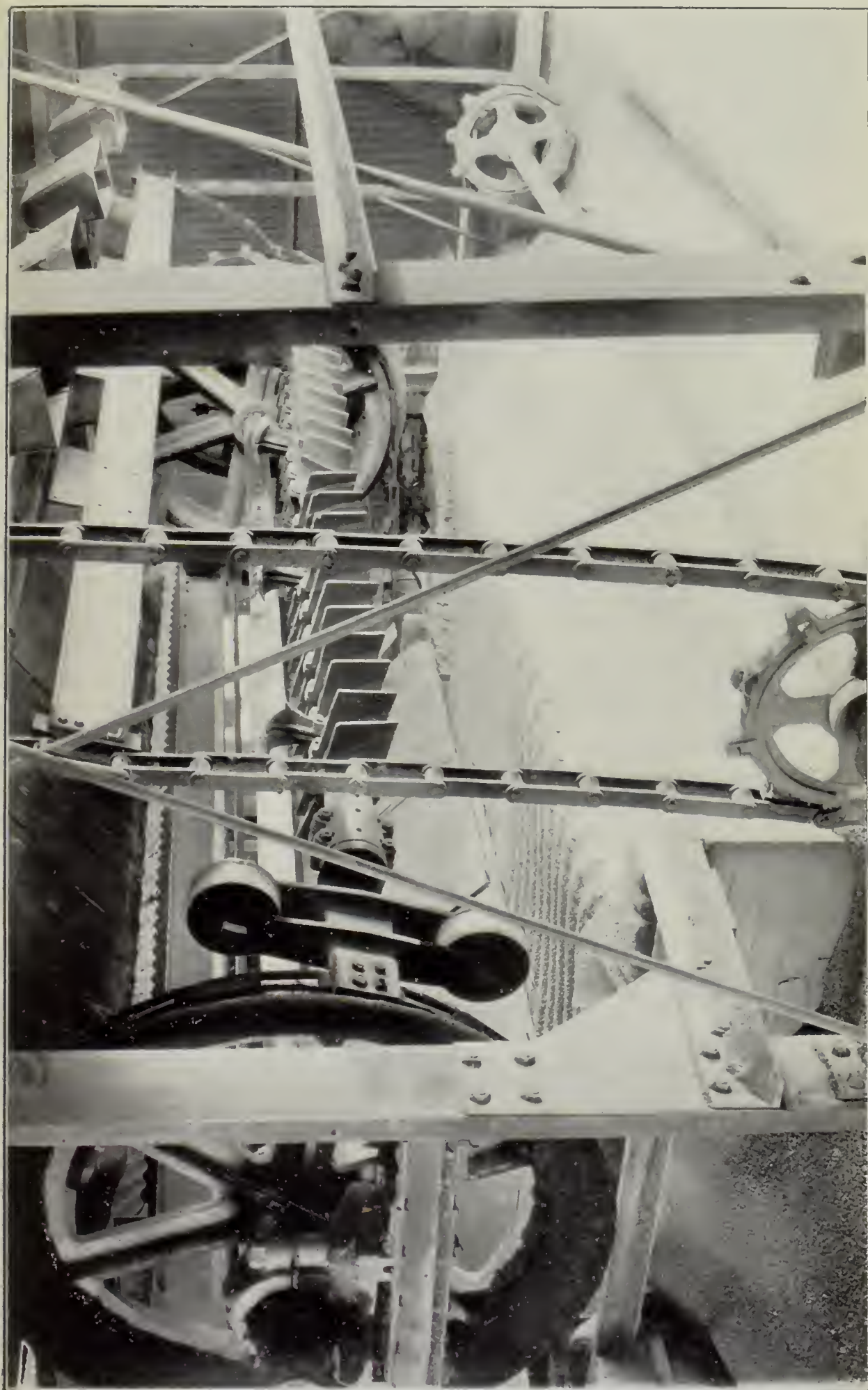
The base ores are roasted to a "dead" or "sweet" condition, or as nearly so as practicable, being finished at a bright red heat. The raw ores, entering the furnace with about 2 to 5 per cent sulphur and 1 to $2\frac{1}{2}$ per cent arsenic, have these constituents reduced to about three-fourths of 1 per cent and one-tenth of 1 per cent, respectively. The high sulphur contents remaining in the roasted ore is almost entirely due to calcium sulphate, the sulphur remaining as sulphides rarely exceeding one-tenth of 1 per cent, and usually being lower. The arsenic sulphides, realgar and orpiment, begin to volatilize with only partial decomposition, causing dense orange-colored vapors to arise, before the ore reaches the first fire box in its travel through the furnace, and by the time it reaches a dull red heat, 90 per cent of these minerals have been discharged, but the most difficult part of the roasting operation follows in completely oxidizing the pyrites and arseno-pyrites. This difficulty is partially due to the fact that a high heat is not permissible on account of the presence of from 5 per cent to 10 per cent of lime in the ore, producing a mixture which sinters easily and is consequently ruined.

It is worthy of note that in most careful investigation and checking of results on the roasting of over 100,000 tons of this arsenical ore no appreciable gold losses could be detected that were traceable to other causes than ordinary dust losses, which were only a small fraction of 1 per cent. The talcose ores are calcined, not so much for the purpose of ridding them of any deleterious compounds as to change their characteristics, although the small amount of arsenic present in them as arsenous acid and its compounds is slightly reduced. The sulphur contents, all of which are present as sulphates of the alkaline earths, are not affected. The primary reason for the calcination of this ore is to dehydrate the clay and talc and deprive them of their properties of plasticity, thus rendering them amenable to percolation, and this is very effectively done. The effect on the clayey ore is much the same as that of burning a brick clay, and the particles of ore which, when raw, would immediately disintegrate on contact with water are, after calcination, unaffected by it. The ore is at the same time rendered extremely porous and permeable by solution, and is thus transformed from an impossible leaching ore to an ideal one.

Both styles of furnace in use have been used as roasters and as calciners.

As roasting furnaces for base ores they have a capacity of 70 tons of roasted ore in twenty-four hours; this capacity, of course, varying somewhat with the varying character of the ore. In roasting base ore the furnaces are driven at about 40 feet per minute rabble speed, with a 4-inch bed of ore on the hearth. As calciners, they have about double the above-named capacity, which is obtained by speeding them up slightly and increasing the feed so as to run a much thicker bed of ore, usually about 6 inches. It requires a given particle of base ores about 8 hours to pass through the furnaces, while the talcose ores, which only require heating to a dull red heat, pass through in six hours.

The Jacklin furnaces have been found better adapted to roasting than the others, both in lower fuel consumption and greater capacity, and are used for that purpose. The other furnaces, which require an excessive amount of fuel to maintain them at high heats, are run at a low heat as calciners. About the same amount of fuel is required for the furnaces whether run as calciners or roasters, viz, $6\frac{1}{2}$ tons of slack



DETAILS STRAIGHT-LINE FURNACE, GOLDEN GATE MILL, MERCUR, UTAH.



LEACHING DEPARTMENT, GOLDEN GATE MILL, MERCUR, UTAH.

coal per day. All the furnaces are run with a light forced draft, Sturtevant blowers being used for that purpose.

After being roasted or calcined as the case may be, the heated ore is elevated at the discharge end of the furnace to a sheet-iron floor above, and is conveyed by the rabbling mechanism in its return motion to the feed end of the furnace. During the six or eight hours required for its return trip it has become cooled, and is sprayed with water until slightly moist, for the double purpose of giving a more porous charge in the leaching tanks and avoiding dust in handling it to them. Just before reaching the feed end of the furnace again, the now roasted and cooled ore is discharged off the side of the furnace and automatically fed to the mixing and charging bin, from which it is drawn into cars for charging the leaching tanks. Four of the furnaces are in such a position that they discharge by gravity into this bin or pit, which is excavated in the middle furnace level, the ore being brought to it from the other furnaces by a system of belt conveyers. Into this pit is also drawn the oxidized ore from the finished ore bin, and it is essential that care be taken to get the most intimate mixture of all classes of ore before charging into the tanks, as otherwise greatly varying leaching rates will maintain, through the different characters of ore, crushed to different degrees of fineness in the same charge, and uniform leaching results be impossible.

The bottom of the charging pit is reached from the leaching section at the level of the top of leaching tanks by a short, double-compartment tunnel. Here, for the first time since leaving the mine, the ore is handled manually, being drawn out of the charging bin into 1-ton side-dumping basket cars and dumped into the tanks from four tracks running longitudinally over the tops of them for the full length of the section.

The filters in the leaching tanks are of gravel 4 inches deep. In constructing them a lattice work is made of 1 by 4 inch pine strips set on edge longitudinally with the tanks, spaced 5-inch centers and held in place by 4 by 1 inch blocks placed 18 inches apart and nailed in, thus making a stiff framework with compartments 4 by 18 inches, and 4 inches deep. These are filled with 2 inches of gravel sized to about three-fourths inch, 1 inch of gravel sized to about one-half inch, and 1 inch of coarsesand. Between each of these layers of filling is laid a strap of 12-ounce burlap, fitting the compartment neatly. On top of the finished gravel bed a covering of 12-ounce burlap is tacked over, and over this a second covering of 16-ounce burlap. Iron strips are then fastened over the covering by nailing them through to each longitudinal strip of the frame. These strips are to protect the cloth in shoveling out tailings. This filter is very effectual, giving a perfectly clear solution under all circumstances. The top covering of 16-ounce burlap has to be renewed about once a year, and in two years it is necessary to renew both covers and replace the 1 inch of sand with fresh material, on account of its having collected enough fine slimes to become hard and slow of filtering. Two men on an eight-hour shift tram the pulp to a tank and fill it, and one additional man—half a shift—levels off the surface and prepares the charge for applying the first solution, and as this labor is paid \$2.50 for eight hours' work, it will be seen that the ore is charged into the vats for less than 2½ cents per ton. All tanks are connected, bottom and top, to one strong solution main, and at top only to weak solution and water mains. The first solution is applied to the ore from the bottom of the charge, under a 14-foot head, from the standardizing tanks above. This solution contains four-tenths to five-tenths of 1 per cent of potassium cyanide, or 8 to 10 pounds of the solid salt per ton of solution, and is allowed to saturate the charge slowly until solution begins to appear at the surface, which requires about eight hours, when it is shut off at the bottom and sufficient additional solution run on top to cover the charge about 2 inches. Thus it is allowed to stand for about 16 hours, when the bottom outlet is opened and percolation started, strong solution being again run in at the top. This is continued for 24 hours and is followed by a weaker solution, of strength three-tenths to thirty-five one-hundredths of 1 per cent, for from forty-eight to seventy-two hours, or until preliminary samples, which are taken every day, indicate that the charge is ready to wash and discharge. Washing and draining requires about twenty-four hours, making the total time from the application of the first solution to the discharge of the final wash, five to six days, and from the time when the tank begins charging till it is again ready to be filled, six or seven days.

All solutions, whether strong, weak, or wash, coming from the leaching tanks run into a common launder direct to the gold solution storage tanks. Percolation is continued without interruption when once started. When a strong solution of forty-five one hundredths of 1 per cent is being used, these mixed solutions coming from the various leaching tanks have a strength of thirty-three one hundredths to thirty-five one hundredths of 1 per cent, and this solution after being precipitated is pumped back and used as weak solution without the addition of any fresh cyanide. The leaching rate varies

greatly with the character of the ore in the charge, being most rapid with charges containing a large proportion of the coarsely crushed oxidized and calcined mixed ores. The practice is to allow three-fourths to 1 inch depth of solution in the leaching tank to pass off each hour, but with charges containing a large proportion of base ore this rate is frequently not attainable, sometimes dropping as low as one-half to one-third of an inch per hour, thus requiring that the charge be given longer time in order to get the necessary amount of solution through it, or that vacuum pumps be used, which is now sometimes done, although the standard practice is to leach by gravity only. The best results are attained when the total solutions and wash passing through the charge is about 2 tons of solution to 1 ton of ore.

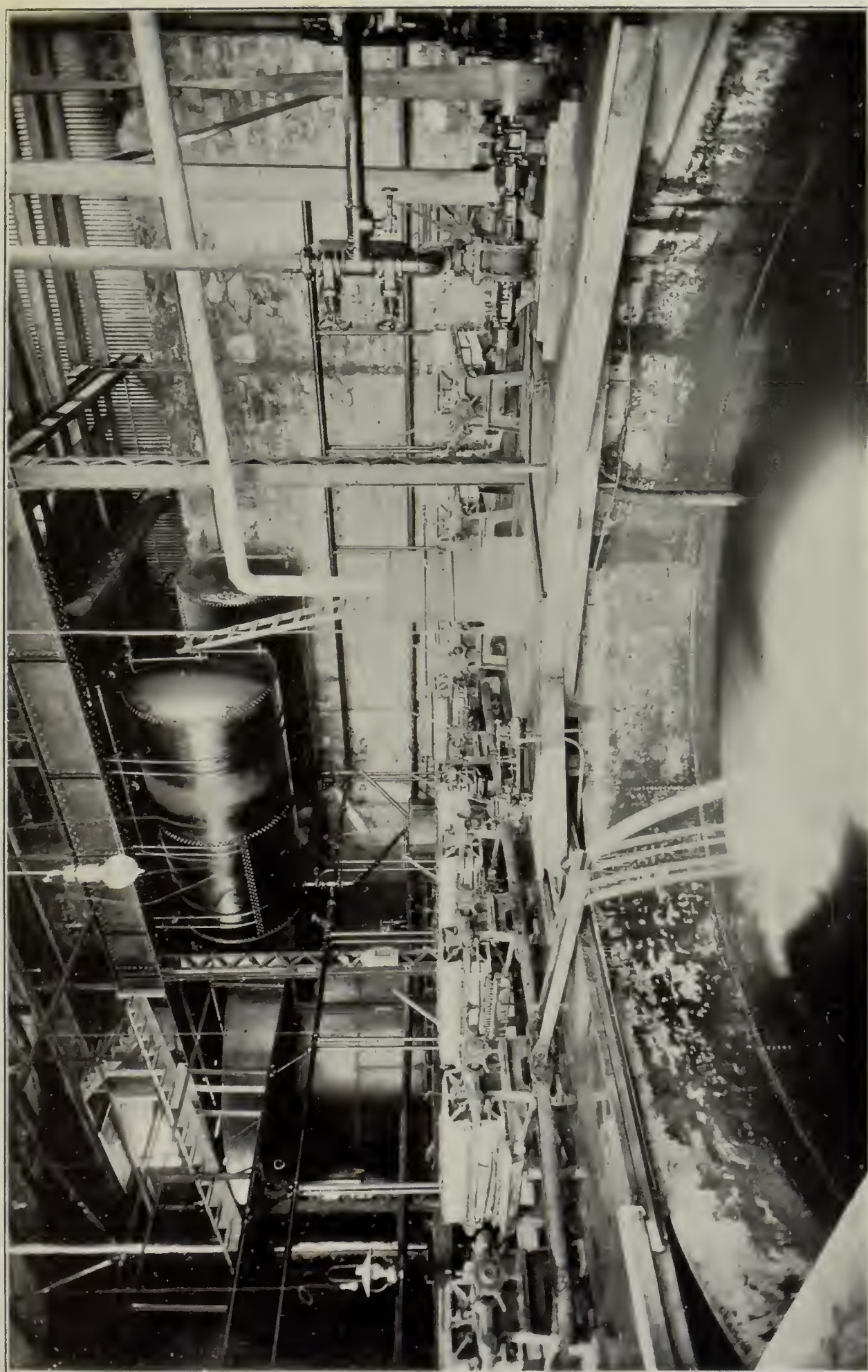
A peculiar condition sometimes arises in tanks containing large proportions of roasted base ore, or all of this class, from the fact that the proportion of calcareous clays and silicious limestones are right to make a pretty good cementing material when burned, and in such cases the charge sets and becomes very hard after about two days' contact with solution, rendering preliminary sampling with an auger very difficult and greatly impeding percolation. When the percentage of limestone is exceptionally high in the ore and is pretty thoroughly burned to lime in the furnaces its subsequent hydration on contact with the solution will even cause a tank charge of ore, all of this class, to swell perceptibly, and in such cases leaching becomes extremely slow and difficult.

The consumption of cyanide in leaching is about nine-tenths of a pound per ton of ore, and a considerable portion of the remainder is lost by imperfectly washing out the weak solution. The actual consumption from the weak solution during its several days of contact is inconsiderable.

The standard strong solution is made by adding the necessary cyanide in lumps to the weak solution formerly described. Before bringing cyanide strength up to standard, however, a sufficient quantity of caustic soda is added to bring the solution to a fixed standard of alkalinity, about a pound of caustic soda per ton of solution being used for this purpose. By this means a very great saving of cyanide is effected, amounting, as found by practice, to about one pound of cyanide saved for every pound of caustic soda used. On account of absence of sufficient water to flush tailings out of tanks, these are discharged by shoveling through gates in the bottom into cars below, holding $2\frac{1}{2}$ tons, and trammed out of the building by men. Each tank is provided with 8 discharge gates, 15 inches in diameter, located above 4 longitudinal tracks running the full length of the building below the tanks. Discharging a tank takes 5 to 7 hours, and costs 6 to 8 cents per ton, depending on the condition of the charge of tailings—i. e., whether they are more or less compact.

Precipitation of the gold from the solution is effected by means of zinc dust. The material used is the blue powder by-product obtained in zinc smelting. The dust used by the company is imported from England and Germany, and contains about 90 per cent metallic zinc. The solution is pumped from the gold solution tanks to the precipitation tanks, of which there are 3. Thirty tons of solution is a charge for precipitation in each tank. While the tank is filling, air at 10 to 15 pounds pressure is blown into the solution through a half-inch pipe, keeping it in a state of violent ebullition. This is done to stir up the precipitate that has settled to the bottom of the tank from former charges, and which contains a large amount of unconsumed zinc.

Five pounds of fresh dust is used for every charge of 30 tons, this amount being seived in, beginning when the tank is half full, and continuing the additions at intervals until the tank is full and the zinc has all been added. The air pipe is then moved about the bottom of the tank for a short time, to thoroughly stir up all sediment again and then removed, and the suspended matter allowed to settle about half an hour, when the supernatant solution is drawn off through an opening in the side of the tank, 8 inches above the bottom and, as it still contains considerable quantities of suspended gold slimes, it is passed through the filter presses to collect these, and runs from them direct to the barren solution sump. It is seldom necessary to use pressure to force the solution through the presses, other than the head of 18 feet between them and the bottom of the precipitation tanks, but sometimes this has to be done when the presses become well filled with slimes, and for this purpose two pressure tanks, of 30 tons' capacity each, are suspended beneath the precipitation tanks and connected with them by large pipes so that a tank of solution can be discharged into them in a very few minutes, and thence forced through the presses and, when it becomes necessary, the solutions can be handled in this way as rapidly as when the presses are free to work by gravity. The filtering medium used in the presses is two layers of light canton flannel, between which is placed a sheet of heavy unsized paper. The precipitating and filtering operation is continuous, as, while one tank is filling another is discharging and the third settling, and by this system as much as 2,500 tons of solution has been precipitated in three tanks in twenty-



FILTER PRESS ROOM, GOLDEN GATE MILL, MERCUR, UTAH.

four hours. The dust precipitation is almost instantaneous, being complete in a sample taken at once after the last zinc has been added. The precipitated solutions after passing the presses, rarely exceed 20 cents per ton in value, and are usually lower. The consumption of zinc dust is about $1\frac{1}{2}$ pounds per ounce of gold recovered.

Clean ups are made monthly, and require about three days, working on the day shift only. The precipitating tanks are allowed to drain and the wet slime scooped into pans, after which the tank is washed out into presses. At the same time the presses are opened and cleaned. The long time occupied in collecting the product is on account of having to clean one tank and three presses only at a time, so that the operation of the plant is only slightly inconvenienced. About half the total value is found in the presses, although the weight of product recovered from the tanks is three-quarters of the whole. The product is taken to a refinery in a separate building and dried in shallow iron pans in a furnace having large cast-iron muffles, into which the pans are put. The cloths from the filter presses are also burned and the product brought to a dull heat, by which most of the remaining metallic zinc is oxidized. After cooling, it is pulverized through a one-fourth-inch screen and sampled. It usually contains from $2\frac{1}{2}$ to 3 ounces of gold per pound of dried product.

It is next treated in a lead-lined dissolving tank with a mixture of dilute sulphuric and nitric acids, by which the remaining zinc and zinc oxide, arsenic, and mercury are removed, as well as considerable quantities of lead coming from zinc and complex cyanides, lime, etc., from the solutions. The nitric acid is used to more effectually oxidize these substances, as well as to, in a great measure at least, prevent the evolution of the deadly arseniureted hydrogen gas. The dissolving tank is covered with a closely fitting hood, which is connected to a large exhaust fan, taking the disagreeable and dangerous gases entirely outside the building and discharging them from a tall stack. The action of the acid is very violent, and it must be added in small quantities to avoid its boiling over the top of the tank. When the addition of fresh acid fails to cause further action, the tank is filled with water and allowed to settle. The supernatant liquor is then drawn off through a pressure tank and filter press and the slimes again agitated with fresh water, this latter operation being repeated twice, to free them, as far as possible, of soluble salts. The slimes are flushed into the pressure tank, filter-pressed into cakes, dried, coarsely pulverized, mixed with a flux of soda, potash, and borax glass, and smelted in graphite crucibles in a double oil-burning furnace capable of receiving two No. 300 crucibles at once. At this stage, before melting, the product contains 60 per cent of gold, the other 40 per cent being largely silicious slimes. The resulting bullion is 0.950 fine and is cast into bars of 1,000 ounces for shipment. This plant is the only one in the district refining its own product, all the other mills shipping to Eastern refineries. The total cost of refining is about 15 cents per ounce of gold.

Nothing has been said regarding the capacity of the mill for the reason that this is a variable quantity, depending on the proportions of the various classes of ores being treated. The plant is designed to handle 1,000 tons, run with seven furnaces on base ores and two on mixed, which gives 800 tons' capacity of roasting and calcining ores, and supplied with 200 tons per day of oxidized or nonroasting ores. This capacity it handles with the utmost ease, the crushing equipment being equal to considerably more. If more calcining and oxidized ores are delivered to the mill the capacity increases, by reason of more furnaces being used as calciners, and putting through double the tonnage they do when used as roasters. If the base ore delivered increases beyond the proportion stated, the capacity of the mill decreases correspondingly. The mill is designed to take the various ores in about the proportion they exist in the mine, but its operation is varied to suit conditions in the mine with regard to the most economical and complete extraction of the ore as it occurs, and the ore bodies are very spotted as regards the different classes of ore.

PRODUCTION OF GOLD AND SILVER IN UTAH DURING THE CALENDAR YEAR 1899.

Summary by counties.	Gold.		Silver.		Total value.
	Fine ounces.	Value.	Fine ounces.	Coining value.	
Beaver	1,083.716	\$32,738.31	244,939.00	\$316,688.80	\$349,427.12
Juab.....	44,917.386	918,188.86	3,329,833.10	4,305,238.73	5,223,427.59
Salt Lake.....	8,611.380	178,013.03	201,801.44	260,914.97	438,928.00
Summit	8,803.797	181,990.63	3,152,329.78	4,075,739.49	4,257,730.12
Tooele	106,214.609	2,195,650.83	225,705.01	291,820.72	2,487,471.55
Washington			28,498.88	36,847.01	36,847.01
Total	169,630.888	3,506,581.66	7,183,107.21	9,287,249.72	12,793,831.39

BULLION OF UTAH PRODUCTION DEPOSITED AT THE UNITED STATES MINTS AND ASSAY
OFFICES DURING THE CALENDAR YEAR 1899.

Institutions.	Gold.		Silver.		Total value.
	Standard ounces.	Value.	Standard ounces.	Coining value.	
Mints:					
Denver	8,583.030	\$159,684.28	5,173.56	\$6,689.05	\$166,373.33
San Francisco	2,875.158	53,491.31	1,660.44	2,146.83	55,638.14
Assay offices:					
Boise	46.640	867.72	6.71	8.67	876.39
New York	27,048.134	51,128.07	499.01	645.18	51,773.25
Total	38,552.962	265,171.38	7,339.72	9,489.73	274,661.11

PRODUCTION OF GOLD AND SILVER IN UTAH (ORIGIN DETAILED), DURING THE CAL-
ENDAR YEAR 1899.

Origin.	Gold.		Silver.		Total value.
	Standard ounces.	Value.	Standard ounces.	Coining value.	
In quartz and dry ores	14,693.951	\$303,750.92	297,185.69	\$384,240.09	\$687,991.01
In cyanide mill bullion	101,214.609	2,092,291.66	82,537.21	106,714.78	2,199,006.44
In lead ores	27,642.931	571,430.11	5,028,660.22	6,501,702.09	7,073,132.20
In copper ores	14,469.427	299,109.60	611,745.33	790,943.46	1,090,053.06
In milling ores	11,609.970	239,999.38	1,162,978.76	1,503,649.30	1,743,648.68
Total	169,630.888	3,506,581.67	7,183,107.21	9,287,249.72	12,793,831.39

ORIGIN BY PERCENTAGES OF THE PRODUCTION OF GOLD AND SILVER IN UTAH DURING
THE CALENDAR YEAR 1899.

Origin.	Gold Percentage.	Silver Percentage.
In quartz and dry ores	8.66	4.13
In cyanide and mill bullion	59.68	1.14
In lead ores	16.29	70.01
In copper ores	8.53	8.53
In milling ores	6.84	16.19
Total	100.00	100.00

PRODUCTION OF COPPER AND LEAD IN UTAH DURING THE CALENDAR YEAR 1899.

Summary, by counties.	Copper.	Lead.
	<i>Fine pounds.</i>	<i>Fine pounds.</i>
Beaver	918,292	4,983,453
Juab	3,441,677	38,080,904
Salt Lake	4,145,028	2,334,731
Summit	805,347	41,884,755
Tooele		423,500
Total	9,310,344	87,707,348

DISPOSITION OF GOLD AND SILVER OF UTAH PRODUCTION DURING THE CALENDAR
YEAR 1899.

Disposition.	Gold.		Silver.		Total value.
	Fine ounces.	Value.	Fine ounces.	Coining value.	
Deposited at the United States mints and assay offices	38,552.962	\$265,171.38	7,339.72	\$9,489.73	\$274,661.11
Shipped to custom smelters and refineries by producers ..	131,077.926	3,241,410.28	7,175,767.49	9,277,759.99	12,519,170.27
Total	169,630.888	3,506,581.66	7,183,107.21	9,287,249.72	12,793,831.38

XIII.

WASHINGTON.

By FREDERICK A. WING,

Assayer in Charge, United States Assay Office, Seattle, Wash.

While the values show a somewhat higher figure, the output from the quartz mines and placers of Washington for the calendar year 1899 hardly attains anticipated proportions. The net increase of nearly \$100,000 is in a measure satisfactory, but many of the conditions that have retarded the work for the last two years still exist. Washington's contribution of precious metals for the year aggregates a total of over a million dollars, as is shown by the following tabulated statement:

TABLE NO. 1.

Metals.	Quantity.	Value.
Gold.....fine ounces..	35, 284. 136	\$729, 387. 82
Silver.....do....	289, 660. 67	374, 510. 76
Copper, at \$17.61 per cwt.....fine pounds..	76, 410	13, 455. 80
Lead, at \$4.47 per cwt.....do....	1, 032, 069	46, 133. 48
Total value		1, 163, 487. 86

TABLE OF INCREASE.

Metals.	1898.		1899.	
	Quantity.	Value.	Quantity.	Value.
Gold.....fine ounces..	29, 611. 196	\$612, 117. 74	35, 284. 136	\$729, 387. 82
Silver.....do....	329, 548. 68	426, 083. 13	289, 660. 67	374, 510. 76
Copper.....fine pounds..			76, 410	13, 455. 80
Lead.....do....	857, 555	32, 415. 58	1, 032, 069	46, 133. 48
Total.....		1, 070, 616. 45		1, 163, 487. 86

Net increase \$92,871.41

The year witnessed greater mining activity throughout the State than for the preceding two years, but results have been more in the line of preparatory development than in actual production. This has been particularly the case in certain of the mining districts along the western slope of the Cascade Range, in Whatcom, Skagit, and Snohomish counties, and while the resultant effects are hardly noticeable in point of actual "dollars and cents," the work is of a substantial character, and will go far toward increasing the importance of these mining centers. Many properties that were mere "prospects" in 1898 are still in an embryonic state, while a few have assumed a more tangible form as producers, only awaiting increased transportation facilities.

Many miles of tram and steam roads have been built, and the rebuilding of the Everett and Monte Cristo Railroad, now progressing rapidly, has stimulated development throughout a vast section of territory which for nearly three years has practically lain dormant. This is especially true in the Miller River district, where much has been done to improve the Cleopatra mine. A wire tram, 4,000 feet long, was erected, enabling them to deliver their ore down to the wagon road, sample shipments of which were made netting several thousand dollars. Other mines tributary to that point, notably the Haber properties, in the Troublesome River district, and the Sunset, at Index, have progressed very satisfactorily.

Owing to the inaccessibility of what is perhaps the richest district in Whatcom County—Mount Baker district—development has been necessarily difficult and arduous. The district embraces many properties known to be very rich in free gold, and upon which much active work has been done. The sale of the Post-Lambert group of five claims to Messrs. John English & Son, and the erection of a ten-stamp mill marks the beginning of actual mining in this district. The ore is very rich in visible free gold and is liberally charged with telluride. Other properties making a fine showing in free-milling ore are the Commodore group of three claims, the Red Mountain, and the properties owned by the Carlisle Company.

In the Slate Creek district most progress has been made on the Mammoth, Mountain Goat, and Eureka, on which stamp mills have been constructed and from which their first contribution to the world's store of precious metals has been received. An up-to-date ten-stamp mill, chlorination works, etc., have been built during the season on the Eureka, and a large force of men is employed, insuring a substantial output for the coming season. A fine body of silvinitic ore was recently encountered, running very high in value. The Mountain Goat is developed to the 400-foot level and has a continuous ore body, the ledge being from 4 to 8 feet wide, assaying very high in value. The Mammoth ledge, running about the same width, is also very rich in free gold and silvinitic. Other properties on which much development work has been done during the year are the Whistler, Gold Ridge, Ninety-Nine, Gilt Edge, and King Solomon. The Slate Creek Company's mining properties are situated on Red Mountain, and the ore resembles the famous Le Roy in character.

The output of the Ruby Creek placers has been considerable for many years, with a slight increase during the past season. The Everett Hydraulic Mining Company owns a large tract of good placer ground near the mouth of Ruby Creek, together with an extensive plant and works, and is prepared for active operation, and inasmuch as considerable value has been taken out by primitive methods in past years, they will, without doubt, with systematic and intelligent work, very materially increase their output in 1900.

Although little actual production has resulted so far from the mines of the Index district, with the single exception of the Republic on the eastern side of the Cascade Range, it has witnessed the most activity of any section in this State. The shipping properties include the Sunset, Golden Tunnel, and Index Mining Company's properties, but many others are rapidly nearing the producing stage, and, taken as a whole, the entire district has been doing much to warrant the oft-repeated statements concerning its future importance as a rich mining center.

If expectations are realized, many valuable copper properties will have passed the preparatory state before the end of another year. This is especially true of the Sunset.

In Pierce County more or less development and prospecting has been carried on during the year, notably in the Carbon River, Summit, Mineral Creek, and Marshall districts, but the production has been very meager.

Many years ago placer discoveries were made in the district lying east of the Cascade Mountains, in Kittitas County, followed later by quartz discoveries yielding to sluice and stamp, only to be abandoned later on, however, from the same causes that have resulted in the desertion of many mining camps. The free gold ran into sulphites after the oxidized material had been exhausted, and so much of the values were lost in treatment that the largest mill in the district, the Blewett, was closed. After several years a new syndicate, composed of Seattle men and known as the Warrior-General Company, took hold of the property, rebuilding a 20-stamp mill, and by the end of another season will have joined the list of producers with every indication of successful prosecution.

The placers of the Swauk, which are in this same district, as well as the placers of the Snake River, have contributed about the same amount as in 1898. On the Cascade, in the Swauk district, considerable new work along the line of improving their property has been done under the able management of Mr. T. P. Carson, insuring an increased production for the following calendar year. They have about $3\frac{1}{2}$ miles of ditch, carrying the waters of Swauk Creek around the hillside and emptying it into Williams Creek. At this point on Williams Creek they have cut a trench across from the surface to bed rock and from high bed rock at the foot of the mountain on the north to high bed rock on the south side, a distance of 436 feet, the depth of gravel varying at this point from 11 to 25 feet. This trench they padded with heavy, tough, yellow clay to prevent seepage. From this point they carry the combined streams through $1\frac{1}{2}$ miles of flume and ditch to a point on the hillside between Williams Creek and Deer Gulch; from thence it is conveyed in two lines of 18-inch iron pipe a distance of 210 feet to the mouth of Deer Gulch, where they have two No. 5 Hoskins giants. Owing to the light grade in the Swauk Creek below this point and a consequent scarcity of dumping ground they were troubled considerably with boulders and tailings piling up, thereby decreasing their capacity. This has been overcome, however, by a very ingenious system originated by Mr. Carson, which consists of lowering the sluice boxes at a point about half their length from the intake and running them at right angles with the upper ones. Over this drop they have constructed a grizzly, through which all the water and fine material passes and is carried away into the creeks. The coarser material, such as boulders, passes over the grizzly, drops into cars, which are hauled up an incline of about 45 degrees and dumped by automatic means, resulting in their piling up the boulders on the bank of the stream, out of the way. These cars are run by an endless chain, which passes over a sprocket, dumping them and returning them suspended on the under side of the track back to the point of starting. They get their power from an 18-inch Tutthill water motor, which takes about 50 inches, and is taken from one of the 18-inch pipes connected just above one of the giants. This means of disposing of boulders should solve a difficult

problem in many placer mines where there is a lack of dumpage ground, as it costs little to operate and is nearly automatic, requiring only a small amount of water and very little care.

Perhaps the largest undertaking in the entire State, in a strictly mining interpretation of the word, is the tunneling of the Palmer Mountain by the Palmer Mountain Gold Mining and Tunnel Company. And while \$100,000 in bullion will cover its output for the season, the work is of such a thorough and systematic nature that it easily takes first rank as an enterprising effort to build a paying mine. Over 5,000 feet of the 8,400 feet of tunnel necessary to reach the objective depth of 4,000 feet have been completed, and in accomplishing this 22 well-defined veins have been crossed, running from 1 foot to 30 feet wide between walls, showing values averaging \$28 per ton in gold. The formation is pronounced dioritic.

The company has a fine water power, over a mile of flume, and many other substantial improvements. But little drifting on the veins has been done as yet, and active mining will not begin for at least another year. On this same mountain are many other fine properties nearing the point of production, notably the Black Bear-War Eagle, on which several hundred feet of shaft and tunnel have been made, and a 5-stamp mill erected. Others are the Puritan, Wehe Consolidated, with 26 claims; the Okanogan Free Gold Mining Company, 8 claims; the Golden Zone, the Ivanhoe, Rain Bow, Triune, and Spokane. Near by the Q. S. Gold Mining and Smelting Company owns 26 locations, showing a large outcropping of copper, on which some 500 feet of crosscut and tunnel have been constructed this season, showing good values in copper, gold, and silver.

Republic, the youngest camp in the State, is by far the largest producer. The Republic Consolidated Gold Mining Company has paid over half a million dollars in dividends this year, besides spending much money in perfecting its mill, 200 tons capacity (Republic Reduction Works Company), and in making other substantial improvements. A large custom mill has been erected, at a cost of \$75,000, making the third in the district in operation.

The Mountain Lion will take a prominent place in the paying mines of this district within the coming year, as it is about completing a 150-ton cyanide amalgamation mill. They have also completed over 3,000 feet of drifting, shafting, and raises within the year.

New camps have been established north and south of Republic during the year, and the Crystal Company, on Myers Creek, has produced somewhat in a small way, having operated a small stamp mill with more or less success.

Over on the Methow, in the southeastern portion of Okanogan County, the Hidden Treasure has been operating with a small force, and they have uncovered a large body of very rich ore, from which a shipment was made with profitable results. Another season will witness greater returns.

In fact, the entire mining interests of the State have shared in the general prosperity of the country, notwithstanding they have been overshadowed by the excitement incident to the continued exploitation of Alaskan fields and retarded through lack of suitable roads in many instances. By the intelligent cooperation of the proper authorities in many of our counties and the judicious expenditure of funds available many districts throughout the State would immediately become prosperous beyond measure from their mining industries

alone, while the advantages to be derived in way of trade in our cities would be enormous.

PRODUCTION OF GOLD AND SILVER IN WASHINGTON (ORIGIN DETAILED) DURING THE CALENDAR YEAR 1899.

Origin.	Gold.		Silver.		Total value.
	Fine ounces.	Value.	Fine ounces.	Coinage value.	
Placer bullion.....	4,389.615	\$90,741.39	1,060.40	\$1,371.02	\$92,112.41
Mill bullion	15,680.340	324,141.39	19,067.44	24,652.85	348,794.24
Copper ore	15.000	310.08	3,000.00	3,878.79	4,188.87
Lead ores.....			148,500.00	192,000.00	192,000.00
Dry ores and concentrates, classified as smelting ores	15,199.181	314,194.96	118,032.83	152,608.10	466 803.06
Total	35,284.136	729,387.82	289,660.67	374,510.76	1,103,898.58

BULLION OF WASHINGTON PRODUCTION DEPOSITED AT THE UNITED STATES MINTS AND ASSAY OFFICES DURING THE CALENDAR YEAR 1899.

Institution.	Gold.		Silver.		Total value.
	Standard ounces.	Value.	Standard ounces.	Coinage value.	
Mint, San Francisco	238.183	\$4,431.31	80.52	\$93.70	\$4,525.01
Assay offices:					
Boise	83.178	1,547.50	12.13	14.11	1,561.61
Helena	508.393	9,458.47	124.48	144.85	9,603.32
Seattle.....	1,103.146	20,523.65	288.97	336.26	20,859.91
Total	1,932.900	35,960.93	506.10	588.92	36,549.85

DISPOSITION OF GOLD AND SILVER OF WASHINGTON PRODUCTION DURING THE CALENDAR YEAR 1899.

Disposition.	Gold.		Silver.		Total value.
	Fine ounces.	Value.	Fine ounces.	Coinage value.	
Deposited at the United States mints and assay offices.....	1,739.610	\$35,960.93	455.49	\$588.92	\$36,549.85
Shipped to custom smelters and refineries by producers.....	33,544.526	693,426.89	289,205.18	373,921.84	1,067,348.73
Total	35,284.136	729,387.82	289,660.67	374,510.76	1,103,898.58

DEPOSITS OF GOLD BULLION AT THE UNITED STATES ASSAY OFFICE, SEATTLE, WASH., DURING THE CALENDAR YEAR 1899.

Source.	Gold.		Silver.		Total value.
	Standard ounces.	Value.	Standard ounces.	Coinage value.	
Alaska	63,299.817	\$1,177,671.01	10,517.13	\$12,238.11	\$1,189,909.12
Idaho	264.325	4,917.67	15.91	18.51	4,936.18
Nevada.....	20.891	388.67	12.35	14.37	403.04
Oregon	96.072	1,787.39	10.91	12.69	1,800.08
South Dakota.....	18.098	336.71	3.54	4.12	310.83
Washington	1,103.146	20,523.64	288.97	336.26	20,859.90
British Columbia.....	45,041.151	837,974.90	12,288.28	14,299.09	852,273.99
Northwest Territory.....	576,673.550	10,728,810.23	147,313.73	171,419.61	10,900,229.84
Mutilated domestic gold coin ..	2.418	45.00			45.00
Jewelry	56.291	1,047.27	21.44	24.95	1,072.22
Total	686,575.759	12,773,502.49	170,472.26	198,367.71	12,971,870.20

XIV.

WYOMING.

By FRANKLIN R. CARPENTER, M. A., Ph. D.,
Mining and Metallurgical Engineer.

I can only report definitely \$26,400 gold from Wyoming for 1899. No answers were received to letters or telegrams. There is some talk of ore shipped, but I can only locate definitely the above, which was gulch gold.

I had more difficulty in getting at exact figures in the Black Hills than ever before, probably owing to the extravagant claims made by others, while in Wyoming no one seems inclined to report anything.

My own opinion is that the Wyoming output can not exceed \$50,000, possibly, from all sources together.

UNITED STATES MINING LAWS, AND REGULATIONS THERE-
UNDER, RELATIVE TO THE RESERVATION, EXPLORATION,
LOCATION, POSSESSION, PURCHASE, AND PATENTING OF THE
MINERAL LANDS IN THE PUBLIC DOMAIN.

DEPARTMENT OF THE INTERIOR,
GENERAL LAND OFFICE.

TITLE XXXII, CHAPTER 6, REVISED STATUTES.

MINERAL LANDS AND MINING RESOURCES.

SEC. 2318. In all cases lands valuable for minerals shall be reserved from sale, except as otherwise expressly directed by law.

Mineral lands reserved.

4 July, 1866, c. 166, s. 5, v. 14, p. 86.

SEC. 2319. All valuable mineral deposits in lands belonging to the United States, both surveyed and unsurveyed, are hereby declared to be free and open to exploration and purchase, and the lands in which they are found to occupation and purchase, by citizens of the United States and those who have declared their intention to become such, under regulations prescribed by law, and according to the local customs or rules of miners in the several mining districts, so far as the same are applicable and not inconsistent with the laws of the United States.

Mineral lands open to purchase by citizens.

10 May, 1872, c. 152, s. 1, v. 17, p. 91.

SEC. 2320. Mining-claims upon veins or lodes of quartz or other rock in place bearing gold, silver, cinnabar, lead, tin, copper, or other valuable deposits, heretofore located, shall be governed as to length along the vein or lode by the customs, regulations, and laws in force at the date of their location. A mining claim located after the tenth day of May, eighteen hundred and seventy-two, whether located by one or more persons, may equal, but shall not exceed, one thousand five hundred feet in length along the vein or lode; but no location of a mining claim shall be made until the discovery of the vein or lode within the limits of the claim located. No claim shall extend more than three hundred feet on each side of the middle of the vein at the surface, nor shall any claim be limited by any mining regulation to less than twenty-five feet on each side of the middle of the vein at the surface, except where adverse rights existing on the tenth day of May, eighteen hundred and seventy-two, render such limitation necessary. The end lines of each claim shall be parallel to each other.

Length of mining claims upon veins or lodes.

10 May, 1872, c. 152, s. 2, v. 17, p. 91.

Proof of citizenship.

10 May, 1872, c. 152, s. 7, v. 17, p. 94.

SEC. 2321. Proof of citizenship, under this chapter, may consist, in the case of an individual, of his own affidavit thereof; in the case of an association of persons unincorporated, of the affidavit of their authorized agent, made on his own knowledge or upon information and belief; and in the case of a corporation organized under the laws of the United States, or of any State or Territory thereof, by the filing of a certified copy of their charter or certificate of incorporation.

Locators' rights of possession and enjoyment.

10 May, 1872, c. 152, s. 3, v. 17, p. 91.

SEC. 2322. The locators of all mining locations heretofore made or which shall hereafter be made, on any mineral vein, lode, or ledge, situated on the public domain, their heirs and assigns, where no adverse claim exists on the tenth day of May, eighteen hundred and seventy-two, so long as they comply with the laws of the United States, and with State, Territorial, and local regulations not in conflict with the laws of the United States governing their possessory title, shall have the exclusive right of possession and enjoyment of all the surface included within the lines of their locations, and of all veins, lodes, and ledges throughout their entire depth, the top or apex of which lies inside of such surface lines extended downward vertically, although such veins, lodes, or ledges may so far depart from a perpendicular in their course downward as to extend outside the vertical side lines of such surface locations. But their right of possession to such outside parts of such veins or ledges shall be confined to such portions thereof as lie between vertical planes drawn downward as above described, through the end lines of their locations, so continued in their own direction that such planes will intersect such exterior parts of such veins or ledges. And nothing in this section shall authorize the locator or possessor of a vein or lode which extends in its downward course beyond the vertical lines of his claim to enter upon the surface of a claim owned or possessed by another.

Owners of tunnels, rights of.

10 May, 1872, c. 152, s. 4, v. 17, p. 92.

SEC. 2323. Where a tunnel is run for the development of a vein or lode, or for the discovery of mines, the owners of such tunnel shall have the right of possession of all veins or lodes within three thousand feet from the face of such tunnel on the line thereof, not previously known to exist, discovered in such tunnel, to the same extent as if discovered from the surface; and locations on the line of such tunnel of veins or lodes not appearing on the surface, made by other parties after the commencement of the tunnel, and while the same is being prosecuted with reasonable diligence, shall be invalid, but failure to prosecute the work on the tunnel for six months shall be considered as an abandonment of the right to all undiscovered veins on the line of such tunnel.

Regulations made by miners.

10 May, 1872, c. 152, s. 5, v. 17, p. 92.

SEC. 2324. The miners of each mining district may make regulations not in conflict with the laws of the United States, or with the laws of the State or Territory in which the district is situated, governing the location, manner of recording, amount of work necessary to hold possession of

a mining claim, subject to the following requirements: The location must be distinctly marked on the ground so that its boundaries can be readily traced. All records of mining claims hereafter made shall contain the name or names of the locators, the date of the location, and such a description of the claim or claims located by reference to some natural object or permanent monument as will identify the claim. On each claim located after the tenth day of May, eighteen hundred and seventy-two, and until a patent has been issued therefor, not less than one hundred dollars' worth of labor shall be performed or improvements made during each year. On all claims located prior to the tenth day of May, eighteen hundred and seventy-two, ten dollars' worth of labor shall be performed or improvements made by the tenth day of June, eighteen hundred and seventy-four, and each year thereafter, for each one hundred feet in length along the vein until a patent has been issued therefor; but where such claims are held in common, such expenditure may be made upon any one claim; and upon a failure to comply with these conditions, the claim or mine upon which such failure occurred shall be open to relocation in the same manner as if no location of the same had ever been made, provided that the original locators, their heirs, assigns, or legal representatives, have not resumed work upon the claim after failure and before such location. Upon the failure of any one of several co-owners to contribute his proportion of the expenditures required hereby, the co-owners who have performed the labor or made the improvements may, at the expiration of the year, give such delinquent co-owner personal notice in writing or notice by publication in the newspaper published nearest the claim, for at least once a week for ninety days, and if at the expiration of ninety days after such notice in writing or by publication such delinquent should fail or refuse to contribute his proportion of the expenditure required by this section, his interest in the claim shall become the property of his co-owners who have made the required expenditures.

SEC. 2325. A patent for any land claimed and located for valuable deposits may be obtained in the following manner: Any person, association, or corporation authorized to locate a claim under this chapter, having claimed and located a piece of land for such purposes, who has, or have, complied with the terms of this chapter, may file in the proper land office an application for a patent, under oath, showing such compliance, together with a plat and field notes of the claim or claims in common, made by or under the direction of the United States surveyor-general, showing accurately the boundaries of the claim or claims, which shall be distinctly marked by monuments on the ground, and shall post a copy of such plat, together with a notice of such application for a patent, in a conspicuous place on the land embraced in such plat previous to the filing of the application for a patent, and shall file

Patents for
mineral lands,
how obtained.

10 May, 1872, c.
152, s. 6, v. 17, p.
92.

an affidavit of at least two persons that such notice has been duly posted, and shall file a copy of the notice in such land office, and shall thereupon be entitled to a patent for the land, in the manner following: The register of the land office, upon the filing of such application, plat, field notes, notices, and affidavits, shall publish a notice that such application has been made, for the period of sixty days, in a newspaper to be by him designated as published nearest to such claim; and he shall also post such notice in his office for the same period. The claimant at the time of filing this application, or at any time thereafter, within the sixty days of publication, shall file with the register a certificate of the United States surveyor-general that five hundred dollars' worth of labor has been expended or improvements made upon the claim by himself or grantors; that the plat is correct, with such further description by such reference to natural objects or permanent monuments as shall identify the claim, and furnish an accurate description, to be incorporated in the patent. At the expiration of the sixty days of publication the claimant shall file his affidavit, showing that the plat and notice have been posted in a conspicuous place on the claim during such period of publication. If no adverse claim shall have been filed with the register and the receiver of the proper land office at the expiration of the sixty days of publication, it shall be assumed that the applicant is entitled to a patent, upon the payment to the proper officer of five dollars per acre, and that no adverse claim exists; and thereafter no objection from third parties to the issuance of a patent shall be heard, except it be shown that the applicant has failed to comply with the terms of this chapter.

Adverse claim,
proceedings on.

10 May, 1872, c.
152, s. 7, v. 17, p.
93.

SEC. 2326. Where an adverse claim is filed during the period of publication, it shall be upon oath of the person or persons making the same, and shall show the nature, boundaries, and extent of such adverse claim, and all proceedings, except the publication of notice and making and filing of the affidavit thereof, shall be stayed until the controversy shall have been settled or decided by a court of competent jurisdiction, or the adverse claim waived. It shall be the duty of the adverse claimant, within thirty days after filing his claim, to commence proceedings in a court of competent jurisdiction, to determine the question of the right of possession, and prosecute the same with reasonable diligence to final judgment; and a failure so to do shall be a waiver of his adverse claim. After such judgment shall have been rendered, the party entitled to the possession of the claim, or any portion thereof, may, without giving further notice, file a certified copy of the judgment roll with the register of the land office, together with the certificate of the surveyor-general that the requisite amount of labor has been expended or improvements made thereon, and the description required in other cases, and shall pay to the receiver five dollars per acre for his claim, together with the proper fees, whereupon the whole pro-

ceedings and the judgment roll shall be certified by the register to the Commissioner of the General Land-Office, and a patent shall issue thereon for the claim, or such portion thereof as the applicant shall appear, from the decision of the court, to rightly possess. If it appears from the decision of the court that several parties are entitled to separate and different portions of the claim, each party may pay for his portion of the claim with the proper fees, and file the certificate and description by the surveyor-general, whereupon the register shall certify the proceedings and judgment-roll to the Commissioner of the General Land-Office, as in the preceding case, and patents shall issue to the several parties according to their respective rights. Nothing herein contained shall be construed to prevent the alienation of a title conveyed by a patent for a mining claim to any person whatever.

SEC. 2327. The description of vein or lode claims, upon surveyed lands, shall designate the location of the claim with reference to the lines of the public surveys, but need not conform therewith; but where a patent shall be issued for claims upon unsurveyed lands, the surveyor general, in extending the surveys, shall adjust the same to the boundaries of such patented claim, according to the plat or description thereof, but so as in no case to interfere with or change the location of any such patented claim.

SEC. 2328. Applications for patents for mining-claims under former laws now pending may be prosecuted to a final decision in the General Land-Office; but in such cases where adverse rights are not affected thereby, patents may issue in pursuance of the provisions of this chapter; and all patents for mining-claims upon veins or lodes heretofore issued shall convey all the rights and privileges conferred by this chapter where no adverse rights existed on the tenth day of May, eighteen hundred and seventy-two.

SEC. 2329. Claims usually called "placers," including all forms of deposit, excepting veins of quartz, or other rock in place, shall be subject to entry and patent, under like circumstances and conditions, and upon similar proceedings, as are provided for vein or lode claims; but where the lands have been previously surveyed by the United States, the entry in its exterior limits shall conform to the legal subdivisions of the public lands.

SEC. 2330. Legal subdivisions of forty acres may be subdivided into ten-acre tracts; and two or more persons, or associations of persons, having contiguous claims of any size, although such claims may be less than ten acres each, may make joint entry thereof; but no location of a placer claim, made after the ninth day of July, eighteen hundred and seventy, shall exceed one hundred and sixty acres for any one person or association of persons, which location shall conform to the United States surveys; and nothing in this section contained shall defeat or impair any bona fide preemption or homestead claim upon agricultural lands, or authorize the sale of the improvements of any bona fide settler to any purchaser.

Description of vein claims on surveyed and unsurveyed lands.

10 May, 1872, c. 152, s. 8, v. 17, p. 94.

Pending applications; existing rights.

10 May, 1872, c. 152, s. 9, v. 17, p. 94.

Conformity of placer claims to surveys, limit of.

9 July, 1870, c. 235, s. 12, v. 16, p. 317.

Subdivisions of ten-acre tracts; maximum of placer locations.

9 July, 1870, c. 235, s. 12, v. 16, p. 317.

Conformity of
placer claims to
surveys, limita-
tion of claims.

10 May, 1872, c.
152, s. 10, v. 17, p.
94.

SEC. 2331. Where placer-claims are upon surveyed lands, and conform to legal subdivisions, no further survey or plat shall be required, and all placer-mining claims located after the tenth day of May, eighteen hundred and seventy-two, shall conform as near as practicable with the United States system of public-land surveys, and the rectangular subdivisions of such surveys, and no such location shall include more than twenty acres for each individual claimant; but where placer-claims can not be conformed to legal subdivisions, survey and plat shall be made as on unsurveyed lands; and where by the segregation of mineral lands in any legal subdivision a quantity of agricultural land less than forty acres remains, such fractional portion of agricultural land may be entered by any party qualified by law, for homestead or preemption purposes.

What evidence
of possession,
&c., to establish
a right to a pat-
ent.

9 July, 1870, c.
235, s. 13, v. 16, p.
217.

SEC. 2332. Where such person or association, they and their grantors, have held and worked their claims for a period equal to the time prescribed by the statute of limitations for mining claims of the State or Territory where the same may be situated, evidence of such possession and working of the claims for such period shall be sufficient to establish a right to a patent thereto under this chapter, in the absence of any adverse claim; but nothing in this chapter shall be deemed to impair any lien which may have attached in any way whatever to any mining claim or property thereto attached prior to the issuance of a patent.

Proceedings for
patent for placer
claim, &c.

10 May, 1872, c.
152, s. 11, v. 17, p.
94.

SEC. 2333. Where the same person, association, or corporation is in possession of a placer-claim, and also a vein or lode included within the boundaries thereof, application shall be made for a patent for the placer-claim, with the statement that it includes such vein or lode, and in such case a patent shall issue for the placer-claim, subject to the provisions of this chapter, including such vein or lode, upon the payment of five dollars per acre for such vein or lode claim, and twenty-five feet of surface on each side thereof. The remainder of the placer-claim, or any placer claim not embracing any vein or lode-claim, shall be paid for at the rate of two dollars and fifty cents per acre, together with all costs of proceedings; and where a vein or lode, such as is described in section twenty-three hundred and twenty, is known to exist within the boundaries of a placer-claim, an application for a patent for such placer-claim which does not include an application for the vein or lode claim shall be construed as a conclusive declaration that the claimant of the placer-claim has no right of possession of the vein or lode claim; but where the existence of a vein or lode in a placer-claim is not known, a patent for the placer-claim shall convey all valuable mineral and other deposits within the boundaries thereof.

Surveyor-gen-
eral to appoint
surveyors of min-
ing claims, &c.

10 May, 1872, c.
152, s. 12, v. 17, p.
95.

SEC. 2334. The surveyor-general of the United States may appoint in each land-district containing mineral lands as many competent surveyors as shall apply for appointment to survey mining-claims. The expenses of the survey of vein or lode claims, and the survey and subdivision

of placer-claims into smaller quantities than one hundred and sixty acres, together with the cost of publication of notices, shall be paid by the applicants, and they shall be at liberty to obtain the same at the most reasonable rates, and they shall also be at liberty to employ any United States deputy surveyor to make the survey. The Commissioner of the General Land-Office shall also have power to establish the maximum charges for surveys and publication of notices under this chapter; and, in case of excessive charges for publication, he may designate any newspaper published in a land-district where mines are situated for the publication of mining-notices in such district, and fix the rates to be charged by such paper; and, to the end that the Commissioner may be fully informed on the subject, each applicant shall file with the register a sworn statement of all charges and fees paid by such applicant for publication and surveys, together with all fees and money paid the register and the receiver of the land office, which statement shall be transmitted, with the other papers in the case, to the Commissioner of the General Land-Office.

SEC. 2335. All affidavits required to be made under this chapter may be verified before any officer authorized to administer oaths within the land-district where the claims may be situated, and all testimony and proofs may be taken before any such officer, and, when duly certified by the officer taking the same, shall have the same force and effect as if taken before the register and receiver of the land-office. In cases of contest as to the mineral or agricultural character of land, the testimony and proofs may be taken as herein provided on personal notice of at least ten days to the opposing party; or if such party can not be found, then by publication of at least once a week for thirty days in a newspaper, to be designated by the register of the land-office as published nearest to the location of such land; and the register shall require proof that such notice has been given.

Verification of affidavits, &c.

10 May, 1872, c. 152, s. 13, v. 17, p. 95.

SEC. 2336. Where two or more veins intersect or cross each other, priority of title shall govern, and such prior location shall be entitled to all ore or mineral contained within the space of intersection; but the subsequent location shall have the right of way through the space of intersection for the purposes of the convenient working of the mine. And where two or more veins unite, the oldest or prior location shall take the vein below the point of union, including all the space of intersection.

Where veins intersect, &c.

10 May, 1872, c. 152, s. 14, v. 17, p. 96.

SEC. 2337. Where non-mineral land not contiguous to the vein or lode is used or occupied by the proprietor of such vein or lode for mining or milling purposes, such non-adjacent surface-ground may be embraced and included in an application for a patent for such vein or lode, and the same may be patented therewith, subject to the same preliminary requirements as to survey and notice as are applicable to veins or lodes; but no location hereafter made of

Patents for non-mineral lands, &c.

10 May, 1872, c. 152, s. 15, v. 17, p. 96.

such non-adjacent land shall exceed five acres, and payment for the same must be made at the same rate as fixed by this chapter for the superficies of the lode. The owner of a quartz-mill or reduction-works, not owning a mine in connection therewith, may also receive a patent for his mill-site, as provided in this section.

What conditions of sale may be made by local legislature.

26 July, 1866, c. 262, s. 5, v. 14, p. 252.

Vested rights to use of water, for mining, &c.; right of way for canals.

26 July, 1866, c. 262, s. 9, v. 14, p. 253.

Patents, pre-emption, and homesteads subject to vested and accrued water rights.

9 July, 1870, c. 235, s. 17, v. 16, p. 218.

Mineral lands in which no valuable mines are discovered open to homesteads.

26 July, 1866, c. 262, s. 10, v. 14, p. 253.

Mineral lands, how set apart as agricultural lands.

26 July, 1866, c. 262, s. 11, v. 14, p. 253.

SEC. 2338. As a condition of sale, in the absence of necessary legislation by Congress, the local legislature of any State or Territory may provide rules for working mines, involving easements, drainage, and other necessary means to their complete development; and those conditions shall be fully expressed in the patent.

SEC. 2339. Whenever, by priority of possession, rights to the use of water for mining, agricultural, manufacturing, or other purposes, have vested and accrued, and the same are recognized and acknowledged by the local customs, laws, and the decisions of courts, the possessors and owners of such vested rights shall be maintained and protected in the same; and the right of way for the construction of ditches and canals for the purposes herein specified is acknowledged and confirmed; but whenever any person, in the construction of any ditch or canal, injures or damages the possession of any settler on the public domain, the party committing such injury or damage shall be liable to the party injured for such injury or damage.

SEC. 2340. All patents granted, or pre-emption or homesteads allowed, shall be subject to any vested and accrued water rights, or rights to ditches and reservoirs used in connection with such water-rights, as may have been acquired under or recognized by the preceding section.

SEC. 2341. Wherever, upon the lands heretofore designated as mineral lands, which have been excluded from survey and sale, there have been homesteads made by citizens of the United States, or persons who have declared their intention to become citizens, which homesteads have been made, improved, and used for agricultural purposes, and upon which there have been no valuable mines of gold, silver, cinnabar, or copper discovered, and which are properly agricultural lands, the settlers or owners of such homesteads shall have a right of pre-emption thereto, and shall be entitled to purchase the same at the price of one dollar and twenty-five cents per acre, and in quantity not to exceed one hundred and sixty acres; or they may avail themselves of the provisions of chapter five of this Title, relating to "Homesteads."

SEC. 2342. Upon the survey of the lands described in the preceding section, the Secretary of the Interior may designate and set apart such portions of the same as are clearly agricultural lands, which lands shall thereafter be subject to pre-emption and sale as other public lands, and be subject to all the laws and regulations applicable to the same.

SEC. 2343. The President is authorized to establish additional land-districts, and to appoint the necessary officers under existing laws, wherever he may deem the same necessary for the public convenience in executing the provisions of this chapter.

Additional land districts and officers, power of the President to provide.

26 July, 1866, c. 262, s. 7, v. 14, p. 252.

SEC. 2344. Nothing contained in this chapter shall be construed to impair, in any way, rights or interests in mining property acquired under existing laws; nor to affect the provisions of the act entitled "An act granting to A. Sutro the right of way and other privileges to aid in the construction of a draining and exploring tunnel to the Comstock lode, in the State of Nevada," approved July twenty-five, eighteen hundred and sixty-six.

Provisions of this chapter not to affect certain rights.

10 May, 1872, c. 152, s. 16, v. 17, p. 96.

'9 July, 1870, c. 235, s. 17, v. 16, p. 218.

SEC. 2345. The provisions of the preceding sections of this chapter shall not apply to the mineral lands situated in the States of Michigan, Wisconsin, and Minnesota, which are declared free and open to exploration and purchase, according to legal subdivisions, in like manner as before the tenth day of May, eighteen hundred and seventy-two. And any bona-fide entries of such lands within the States named since the tenth day of May, eighteen hundred and seventy-two, may be patented without reference to any of the foregoing provisions of this chapter. Such lands shall be offered for public sale in the same manner, at the same minimum price, and under the same rights of pre-emption as other public lands.

Mineral lands in certain States excepted.

18 Feb., 1873, c. 159, v. 17, p. 465.

SEC. 2346. No act passed at the first session of the Thirty-eighth Congress, granting lands to States or corporations to aid in the construction of roads or for other purposes, or to extend the time of grants made prior to the thirtieth day of January, eighteen hundred and sixty-five, shall be so construed as to embrace mineral lands, which in all cases are reserved exclusively to the United States, unless otherwise specially provided in the act or acts making the grant.

Grant of lands to States or corporations not to include mineral lands.

30 Jan., 1865, Res. No. 10, v. 13, p. 567.

ACTS OF CONGRESS PASSED SUBSEQUENT TO THE REVISED STATUTES.

AN ACT to amend the act entitled "An act to promote the development of the mining resources of the United States," passed May tenth, eighteen hundred and seventy-two.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the provisions of the fifth section of the act entitled "An act to promote the development of the mining resources of the United States," passed May tenth, eighteen hundred and seventy-two, which requires expenditures of labor and improvements on claims located prior to the passage of said act, are hereby so amended that the time for the first annual expenditure on claims located prior to the passage of said act shall be extended to the first day of January, eighteen hundred and seventy-five.

Claim located prior to May 10, 1872, first annual expenditure extended to Jan. 1, 1875.

Act of Congress appd. June 6, 1874 (18 Stat. L., 61).

AN ACT to amend section two thousand three hundred and twenty-four of the Revised Statutes, relating to the development of the mining resources of the United States.

Money expended in a tunnel considered as expended on the lode.

Act of Congress approved February 11, 1875 (18 Stat. L., 315).

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That section two thousand three hundred and twenty-four of the Revised Statutes, be, and the same is hereby, amended so that where a person or company has or may run a tunnel for the purpose of developing a lode or lodes, owned by said person or company, the money so expended in said tunnel shall be taken and considered as expended on said lode or lodes, whether located prior to or since the passage of said act; and such person or company shall not be required to perform work on the surface of said lode or lodes in order to hold the same as required by said act.

AN ACT to exclude the States of Missouri and Kansas from the provisions of the act of Congress entitled "An act to promote the development of the mining resources of the United States," approved May tenth, eighteen hundred and seventy-two.

Missouri and Kansas excluded from the operation of the mineral laws.

Act of Congress approved May 5, 1876 (19 Stat. L., 52).

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That within the States of Missouri and Kansas deposits of coal, iron, lead, or other mineral be, and they are hereby, excluded from the operation of the act entitled "An act to promote the development of the mining resources of the United States," approved May tenth, eighteen hundred and seventy-two and all lands in said States shall be subject to disposal as agricultural lands.

AN ACT authorizing the citizens of Colorado, Nevada, and the Territories to fell and remove timber on the public domain for mining and domestic purposes.

Citizens of Colorado, Nevada, and the Territories authorized to fell and remove timber on the public domain for mining and domestic purposes.

Act of Congress approved June 3, 1878 (20 Stat. L., 88).

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That all citizens of the United States and other persons, bona fide residents of the State of Colorado, or Nevada, or either of the Territories of New Mexico, Arizona, Utah, Wyoming, Dakota, Idaho, or Montana, and all other mineral districts of the United States, shall be, and are hereby, authorized and permitted to fell and remove, for building, agricultural, mining, or other domestic purposes, any timber or other trees growing or being on the public lands, said lands being mineral, and not subject to entry under existing laws of the United States, except for mineral entry, in either of said States, Territories, or districts of which such citizens or persons may be at the time bona fide residents, subject to such rules and regulations as the Secretary of the Interior may prescribe for the protection of the timber and of the undergrowth growing upon such lands, and for other purposes: *Provided,* The provisions of this act shall not extend to railroad corporations.

SEC. 2. That it shall be the duty of the register and the receiver of any local land office in whose district any min-

eral land may be situated to ascertain from time to time whether any timber is being cut or used upon any such lands, except for the purposes authorized by this act, within their respective land districts; and, if so, they shall immediately notify the Commissioner of the General Land Office of that fact; and all necessary expenses incurred in making such proper examinations shall be paid and allowed such register and receiver in making up their next quarterly accounts.

SEC. 3. Any person or persons who shall violate the provisions of this act, or any rules and regulations in pursuance thereof made by the Secretary of the Interior, shall be deemed guilty of a misdemeanor, and, upon conviction, shall be fined in any sum not exceeding five hundred dollars, and to which may be added imprisonment for any term not exceeding six months.

AN ACT to amend sections twenty-three hundred and twenty-four and twenty-three hundred and twenty-five of the Revised Statutes of the United States concerning mineral lands.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That section twenty-three hundred and twenty-five of the Revised Statutes of the United States be amended by adding thereto the following words: "*Provided*, That where the claimant for a patent is not a resident of or within the land district wherein the vein, lode, ledge, or deposit sought to be patented is located, the application for patent and the affidavits required to be made in this section by the claimant for such patent may be made by his, her, or its authorized agent, where said agent is conversant with the facts sought to be established by said affidavits: *And provided*, That this section shall apply to all applications now pending for patents to mineral lands."

Application for patent may be made by authorized agent.

SEC. 2. That section twenty-three hundred and twenty-four of the Revised Statutes of the United States be amended by adding the following words: "*Provided*, That the period within which the work required to be done annually on all unpatented mineral claims shall commence on the first day of January succeeding the date of location of such claim, and this section shall apply to all claims located since the tenth day of May, anno Domini eighteen hundred and seventy-two."

On unpatented claims period commences on Jan. 1 succeeding date of location.

Act of Congress appd. Jan. 22, 1880 (21 Stat. L., 61).

AN ACT to amend section twenty-three hundred and twenty-six of the Revised Statutes relating to suits at law affecting the title to mining-claims.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That if, in any action brought pursuant to section twenty-three hundred and twenty-six of the Revised Statutes, title to the ground in controversy shall not be established by either party, the jury shall so find, and judgment shall be

In action brought title not established in either party.

Act of Congress approved March 3, 1881 (21 Stat. L., 505).

entered according to the verdict. In such case costs shall not be allowed to either party, and the claimant shall not proceed in the land office or be entitled to a patent for the ground in controversy until he shall have perfected his title.

AN ACT to amend section twenty-three hundred and twenty-six of the Revised Statutes, in regard to mineral lands, and for other purposes.

Adverse claim may be verified by agent.

Sec. 1, act of Congress approved April 26, 1882 (22 Stat. L., 49).

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the adverse claim required by section twenty-three hundred and twenty-six of the Revised Statutes may be verified by the oath of any duly authorized agent or attorney in fact of the adverse claimant cognizant of the facts stated; and the adverse claimant, if residing or at the time being beyond the limits of the district wherein the claim is situated, may make oath to the adverse claim before the clerk of any court of record of the United States or the State or Territory where the adverse claimant may then be, or before any notary public of such State or Territory.

Affidavit of citizenship; before whom made.

Sec. 2, act of Congress approved April 26, 1882 (22 Stat. L., 49).

SEC. 2. That applicants for mineral patents, if residing beyond the limits of the district wherein the claim is situated, may make any oath or affidavit required for proof of citizenship before the clerk of any court of record, or before any notary public of any State or Territory.

AN ACT to exclude the public lands in Alabama from the operation of the laws relating to mineral lands.

Alabama excepted from the operation of the mineral laws.

Act of Congress approved March 3, 1883 (22 Stat. L., 487).

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That within the State of Alabama all public lands, whether mineral or otherwise, shall be subject to disposal only as agricultural lands: *Provided, however,* That all lands which have heretofore been reported to the General Land Office as containing coal and iron shall first be offered at public sale: *And provided further,* That any bona fide entry under the provisions of the homestead law of lands within said State heretofore made may be patented without reference to an act approved May tenth, eighteen hundred and seventy-two, entitled "An act to promote the development of the mining resources of the United States," in cases where the persons making application for such patents have in all other respects complied with the homestead law relating thereto.

AN ACT providing a civil government for Alaska.

Mining laws extended to the District of Alaska.

Act of Congress approved May 17, 1884 (23 Stat. L., 24).

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, * * *

SEC. 8. That the said district of Alaska is hereby created a land district, and a United States land office for said district is hereby located at Sitka. The commissioner provided for by this act to reside at Sitka shall be ex officio register of said land office, and the clerk provided for by this act shall be ex officio receiver of public moneys and

the marshal provided for by this act shall be ex officio surveyor-general of said district and the laws of the United States relating to mining claims, and the rights incident thereto, shall, from and after the passage of this act, be in full force and effect in said district, under the administration thereof herein provided for, subject to such regulations as may be made by the Secretary of the Interior, approved by the President: *Provided*, That the Indians or other persons in said district shall not be disturbed in the possession of any lands actually in their use or occupation or now claimed by them but the terms under which such persons may acquire title to such lands is reserved for future legislation by Congress: *And provided further*, That parties who have located mines or mineral privileges therein under the laws of the United States applicable to the public domain, or who have occupied and improved or exercised acts of ownership over such claims, shall not be disturbed therein, but shall be allowed to perfect their title to such claims by payment as aforesaid: *And provided also*, That the land not exceeding six hundred and forty acres at any station now occupied as missionary stations among the Indian tribes in said section, with the improvements thereon erected by or for such societies, shall be continued in the occupancy of the several religious societies to which said missionary stations respectively belong until action by Congress. But nothing contained in this act shall be construed to put in force in said district the general land laws of the United States.

* * * * *

AN ACT making appropriations for sundry civil expenses of the Government for the fiscal year ending June thirtieth, eighteen hundred and ninety-one, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, * * *

No person who shall after the passage of this act, enter upon any of the public lands with a view to occupation, entry, or settlement under any of the land laws shall be permitted to acquire title to more than three hundred and twenty acres in the aggregate, under all of said laws, but this limitation shall not operate to curtail the right of any person who has heretofore made entry or settlement on the public lands, or whose occupation, entry or settlement, is validated by this act: *Provided*, That in all patents for lands hereafter taken up under any of the land laws of the United States or on entries or claims validated by this act west of the one hundredth meridian, it shall be expressed that there is reserved from the lands in said patent described a right of way thereon for ditches or canals constructed by the authority of the United States. * * *

Right of entry under all the land laws restricted to 320 acres. (Repealed, see act Mar. 3, 1891, sec. 17.)
Reservation in patents for right of way for ditches and canals constructed.
Act of Congress approved Aug. 30, 1890 (26 Stat. L., 371).

AN ACT to repeal the timber-culture laws, and for other purposes.

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, * * **

Town sites on mineral lands authorized.

Lands entered under the mineral laws not included in restriction to 320 acres.

Act of Congress approved Mar. 3, 1891 (26 Stat. L., 1095).

SEC. 16. That town-site entries may be made by incorporated towns and cities on the mineral lands of the United States, but no title shall be acquired by such towns or cities to any vein of gold, silver, cinnabar, copper, or lead, or to any valid mining claim or possession held under existing law. When mineral veins are possessed within the limits of an incorporated town or city, and such possession is recognized by local authority or by the laws of the United States, the title to town lots shall be subject to such recognized possession and the necessary use thereof and when entry has been made or patent issued for such town sites to such incorporated town or city, the possessor of such mineral vein may enter and receive patent for such mineral vein, and the surface ground appertaining thereto: *Provided*, That no entry shall be made by such mineral-vein claimant for surface ground where the owner or occupier of the surface ground shall have had possession of the same before the inception of the title of the mineral-vein applicant.

SEC. 17. That reservoir sites located or selected and to be located and selected under the provisions of "An act making appropriations for sundry civil expenses of the Government for the fiscal year ending June thirtieth, eighteen hundred and eighty-nine, and for other purposes," and amendments thereto, shall be restricted to and shall contain only so much land as is actually necessary for the construction and maintenance of reservoirs; excluding so far as practicable lands occupied by actual settlers at the date of the location of said reservoirs and that the provisions of "An act making appropriations for sundry civil expenses of the Government for the fiscal year ending June thirtieth, eighteen hundred and ninety-one, and for other purposes," which reads as follows, viz: "no person who shall after the passage of this act enter upon any of the public lands with a view to occupation, entry, or settlement under any of the land laws shall be permitted to acquire title to more than three hundred and twenty acres in the aggregate under all said laws," shall be construed to include in the maximum amount of lands the title to which is permitted to be acquired by one person only agricultural lands and not include lands entered or sought to be entered under mineral land laws.

* * * * *

AN ACT to authorize the entry of lands chiefly valuable for building stone under the placer mining laws.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That any person authorized to enter lands under the mining laws of the United States may enter lands that are chiefly valuable for building stone under the provisions of the law in relation to placer-mineral claims: *Provided, That* lands reserved for the benefit of the public schools or donated to any State shall not be subject to entry under this act.

Entry of lands chiefly valuable for building stone under the placer-mining laws.

Act of Congress approved Aug. 4, 1892 (27 Stat. L., 348).

AN ACT to amend section numbered twenty-three hundred and twenty-four of the Revised Statutes of the United States, relating to mining claims.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the provisions of section numbered twenty-three hundred and twenty-four of the Revised Statutes of the United States, which require that on each claim located after the tenth day of May, eighteen hundred and seventy-two, and until patent has been issued therefor, not less than one hundred dollars' worth of labor shall be performed or improvements made during each year, be suspended for the year eighteen hundred and ninety-three so that no mining claim which has been regularly located and recorded as required by the local laws and mining regulations shall be subject to forfeiture for nonperformance of the annual assessment for the year eighteen hundred and ninety-three: *Provided, That* the claimant or claimants of any mining location, in order to secure the benefits of this act shall cause to be recorded in the office where the location notice or certificate is filed on or before December thirty-first, eighteen hundred and ninety-three, a notice that he or they, in good faith intend to hold and work said claim: *Provided, however, That* the provisions of this act shall not apply to the State of South Dakota.

Requirement of proof of expenditure for the year 1893 suspended except as to South Dakota.

Act of Congress approved Nov. 3, 1893 (28 Stat. L., 6).

This act shall take effect from and after its passage.

AN ACT to amend section numbered twenty-three hundred and twenty-four of Revised Statutes of the United States relating to mining claims.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the provisions of section numbered twenty-three hundred and twenty-four of the Revised Statutes of the United States, which require that on each claim located after the tenth day of May, eighteen hundred and seventy-two, and until patent has been issued therefor, not less than one hundred dollars' worth of labor shall be performed or improvements made during each year, be suspended for the year eighteen hundred and ninety-four, so that no mining claim which has been regularly located and recorded as required by the local laws and mining regulations shall be

Requirement of proof of expenditure for the year 1894 suspended except as to South Dakota.

Act of Congress approved July 18, 1894 (28 Stat. L., 114).

subject to forfeiture for nonperformance of the annual assessment for the year eighteen hundred and ninety-four: *Provided*, That the claimant or claimants of any mining location, in order to secure the benefits of this act, shall cause to be recorded in the office where the location notice or certificate is filed, on or before December thirty-first, eighteen hundred and ninety-four, a notice that he or they in good faith intend to hold and work said claim: *Provided, however*, That the provisions of this act shall not apply to the State of South Dakota.

SEC. 2. That this act shall take effect from and after its passage.

AN ACT to authorize the entry and patenting of lands containing petroleum and other mineral oils under the placer mining laws of the United States.

Entry and patenting of lands containing petroleum and other mineral oils under the placer-mining laws.

Act of Congress approved February 11, 1897 (29 Stat. L., 526).

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That any person authorized to enter lands under the mining laws of the United States may enter and obtain patent to lands containing petroleum or other mineral oils, and chiefly valuable therefor, under the provisions of the laws relating to placer mineral claims: *Provided*, That lands containing such petroleum or other mineral oils which have heretofore been filed upon, claimed, or improved as mineral, but not yet patented, may be held and patented under the provisions of this act the same as if such filing, claim, or improvement were subsequent to the date of the passage hereof.

AN ACT extending the homestead laws and providing for right of way for railroads in the District of Alaska, and for other purposes.

Mining rights in Alaska to native-born citizens of the Dominion of Canada.

Act of Congress approved, May 14, 1898 (30 Stat. L.).

SEC. 13. That native-born citizens of the Dominion of Canada shall be accorded in said District of Alaska the same mining rights and privileges accorded to citizens of the United States in British Columbia and the Northwest Territory by the laws of the Dominion of Canada or the local laws, rules, and regulations; but no greater rights shall be thus accorded than citizens of the United States or persons who have declared their intention to become such may enjoy in said District of Alaska; and the Secretary of the Interior shall from time to time promulgate and enforce rules and regulations to carry this provision into effect.

AN ACT To relieve owners of mining claims who enlist in the military or naval service of the United States for duty in the war with Spain from performing assessment work during such term of service.

Public lands. Mining claims of persons enlisting not subject to forfeiture for nonperformance of annual labor, etc.

R. S., sec. 2324, p. 246.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the provisions of section twenty-three hundred and twenty-four of the Revised Statutes of the United States, which require that on each claim located after the tenth day of May, eighteen hundred and seventy-two, and until patent has been issued therefor, not less than one hundred dol-

lars' worth of labor shall be performed or improvements made during each year, shall not apply to claims or parts of claims owned by persons who may enlist in the volunteer army or navy of the United States for service in a war between this country and Spain, so that no mining claim or any part thereof owned by such person which has been regularly located and recorded shall be subject to forfeiture for nonperformance of the annual assessments until six months after such owner is mustered out of the service, or, if he should not survive the war, then six months after his death in the service.

SEC. 2. That those desiring to take advantage of this Act shall file, or cause to be filed, a notice in the clerk's office where the location certificate of said mine is recorded before the expiration of the assessment year, giving notice of his enlistment and of his desire to hold said claim under this Act. Notice of enlistment.

SEC. 3. That if any such enlisted soldier or sailor has a co-owner or co-owners in any mining claim, and who are not in the Army or Navy, and such co-owner or co-owners fail to do such a proportion of one hundred dollars' worth of work per annum as the interest of such nonenlisted person or persons bears to the whole claim, then such interest shall be open to relocation by any other qualified person or persons by their doing the necessary work thereon and filing an affidavit of labor showing the forfeiture and that the relocators had done the annual work required of such nonenlisted persons and succeeded them in right under this Act, which work may be done at any time after the expiration of the assessment year and before the former owners resume work thereon. The work and affidavit aforesaid shall operate as a transfer of said forfeited interest from the former owners to said relocators. No exemption to co-owners not enlisted.

AN ACT To set aside a portion of certain lands in the State of Washington, now known as the Pacific Forest Reserve, as a public park, to be known as the Mount Ranier National Park. Act of Congress approved July 2, 1898 (30 Stat. L., 651).

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, Mineral-land laws extended to park.
* * *

SEC. 5. That the mineral-land laws of the United States are hereby extended to the lands lying within the said reserve and said park. Act of Congress approved March 2, 1899 (30 Stat. L. 995).

AN ACT Making further provision for a civil government for Alaska, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, * * *

SEC. 13. The judges of the district, or a majority of them, shall, as soon as practicable after their appointment, meet, and by appropriate order, to be thereafter entered in each division of the court, divide the district into three recording divisions, designate the division of the court to supervise each, and also define the boundaries thereof by

reference to natural objects and permanent landmarks or monuments, in such manner that the boundaries of each recording division can be readily determined and become generally known from such description, which order shall be given publicity in such manner by posting, publication, or otherwise as the judges or any division of the court may direct, the necessary expense of the publication of such order and description of the recording divisions to be allowed and paid as other court expenses.

At any regular or special term an order may be made by the court establishing one or more recording districts within the recording division under the supervision of such division of the court and defining the boundaries thereof by reference to natural objects and permanent landmarks or monuments, in such manner that the boundaries thereof can be readily determined.

The order establishing a recording district shall designate a commissioner to be ex officio recorder thereof, and shall also designate the place where the commissioner shall keep his recording office within the recording district.

Provided, The clerk of the court shall be ex officio recorder of all that portion of the recording division under the supervision of his division of the court not embraced within the limits of a recording district established, bounded, and described therein as authorized by this Act, and when any part of the division for which a clerk has been recording shall be embraced in a recording district, such clerk shall transcribe that portion of his records appertaining to such district and deliver the same to the commissioner designated as recorder thereof.

Whenever it appears to the satisfaction of the court that the public interests demand, or that the convenience of the people require, the court may change or modify the boundaries or discontinue a recording district or change the location of the recording office, or remove the commissioner acting as ex officio recorder, and appoint another commissioner to fill the office.

SEC. 14. The clerk as ex officio recorder must procure such books for records as the business of his office requires and such as may be required by the respective commissioners designated as recorders in his division of the court, but orders for the same must first be obtained from the court or the judge thereof. The respective officers acting as ex officio recorders shall have the custody and must keep all the books, records, maps, and papers deposited in their respective offices, and where a recorder is removed or from any cause becomes unable to act, or a recording district is discontinued, the records and all books, papers, and property relating thereto shall be delivered to the clerk or such officer or person as the court or judge thereof may direct.

The record books procured by the clerk, as herein provided, shall be paid for by him, on the order of the court, out of any moneys in his hands, as other court expenses are paid.

SEC. 15. The respective recorders shall, upon the payment of the fees for the same prescribed by the Attorney-General, record separately, in large and well-bound separate books, in fair hand:

First. Deeds, grants, transfers, contracts to sell or convey real estate and mortgages of real estate, releases of mortgages, powers of attorney, leases which have been acknowledged or proved, mortgages upon personal property;

Second. Certificates of marriage and marriage contracts and births and deaths;

Third. Wills devising real estate admitted to probate;

Fourth. Official bonds;

Fifth. Transcripts of judgments which by law are made liens upon real estate;

Sixth. All orders and judgments made by the district court or the commissioners in probate matters affecting real estate which are required to be recorded;

Seventh. Notices and declaration of water rights;

Eighth. Assignments for the benefit of creditors;

Ninth. Affidavits of annual work done on mining claims;

Tenth. Notices of mining location and declaratory statements;

Eleventh. Such other writings as are required or permitted by law to be recorded, including the liens of mechanics, laborers, and others: *Provided*, Notices of location of mining claims shall be filed for record within ninety days from the date of the discovery of the claim described in the notice, and all instruments shall be recorded in the recording district in which the property or subject-matter affected by the instrument is situated, and where the property or subject-matter is not situated in any established recording district the instrument affecting the same shall be recorded in the office of the clerk of the division of the court having supervision over the recording division in which such property or subject-matter is situated.

SEC. 16. Any clerk or commissioner authorized to record any instrument who having collected fees for so doing fails to record such instrument shall account to his successor in office, or to such person as the court may direct, for all the fees received by him for recording any instrument on file and unrecorded at the expiration of his official term, or at the time he is required to transfer his records to another officer under the direction of the court. And any clerk or commissioner who fails, neglects, or refuses to so account for fees received and not actually earned by the recording of instrument shall be deemed guilty of a misdemeanor, and on conviction thereof shall be fined not less than one hundred dollars, nor more than one thousand dollars, and imprisoned for not more than one year, or until the fees received and unearned as aforesaid shall have been properly accounted for and paid over by him, as hereinbefore provided. And in addition such fees may be recovered from such clerk or commissioner or the bondsmen of either, in a civil action which shall be brought by the district attorney, in the name of the United States, to recover the same; and the amount when recovered shall be by the court transferred to the successor in office of such recorder, who shall thereupon proceed to record the unrecorded instruments: *Provided*, Miners in any organized mining district may make rules and regulations governing the recording of notices of location of mining claims, water rights, flumes and ditches, mill sites and affidavits of labor, not in conflict with this Act or the general laws of the United States; and nothing in this Act shall be construed so as to prevent the miners in any regularly organized mining district not within any recording district established by the court from electing their own mining recorder to act as such until a recorder therefor is appointed by the court: *Provided further*, All records heretofore regularly made by the United States commissioner at Dyea, Skagway, and the recorder at Douglas City, not in conflict

with any records regularly made with the United States commissioner at Juneau, are hereby legalized. And all records heretofore made in good faith in any regularly organized mining district are hereby made public records, and the same shall be delivered to the recorder for the recording district including such mining district within six months from the passage of this Act.

* * * * *

SEC. 26. The laws of the United States relating to mining claims, mineral locations, and rights incident thereto are hereby extended to the District of Alaska: *Provided*, That subject only to such general limitations as may be necessary to exempt navigation from artificial obstructions all land and shoal water between low and mean high tide on the shores, bays, and inlets of Bering Sea, within the jurisdiction of the United States, shall be subject to exploration and mining for gold and other precious metals by citizens of the United States, or persons who have legally declared their intentions to become such, under such reasonable rules and regulations as the miners in organized mining districts may have heretofore made or may hereafter make governing the temporary possession thereof for exploration and mining purposes until otherwise provided by law: *Provided further*, That the rules and regulations established by the miners shall not be in conflict with the mining laws of the United States; and no exclusive permit shall be granted by the Secretary of War authorizing any person or persons, corporation or company to excavate or mine under any of said waters below low tide, and if such exclusive permit has been granted it is hereby revoked and declared null and void; but citizens of the United States or persons who have legally declared their intention to become such shall have the right to dredge and mine for gold or other precious metals in said waters, below low tide, subject to such general rules and regulations as the Secretary of War may prescribe for the preservation of order and the protection of the interests of commerce; such rules and regulations shall not, however, deprive miners on the beach of the right hereby given to dump tailings into or pump from the sea opposite their claims, except where such dumping would actually obstruct navigation, and the reservation of a roadway sixty feet wide, under the tenth section of the Act of May fourteenth, eighteen hundred and ninety-eight, entitled "An Act extending the homestead laws and providing for right of way for railroads in the District of Alaska, and for other purposes," shall not apply to mineral lands or town sites.

SEC. 27. The Indians or persons conducting schools or missions in the district shall not be disturbed in the possession of any lands now actually in their use or occupation, and the land, at any station not exceeding six hundred and forty acres, now occupied as missionary stations among the Indian tribes in the section, with the improvements thereon erected by or for such societies, shall be continued in the occupancy of the several religious societies to which the missionary stations respectively belong, and the Secretary of the Interior is hereby directed to have such lands surveyed in compact form as nearly as practicable and patents issued for the same to the several societies to which they belong; but nothing contained in this Act shall be construed to put in force in the district the general land laws of the United States.

AN ACT To ratify an agreement with the Indians of the Fort Hall Indian Reservation in Idaho, and making appropriations to carry the same into effect.

Whereas Benjamin F. Barge, James H. McNeely, and Charles G. Hoyt, acting for the United States, did, on the fifth day of February, anno Domini eighteen hundred and ninety-eight, make and conclude the following agreement with the Shoshone and Bannock Indians of the Fort Hall Reservation, in Idaho; and

Whereas Benjamin F. Barge, James H. McNeely, and Charles G. Hoyt, being duly appointed and acting commissioners on behalf of the United States for such purposes, have concluded an agreement with the headmen and a majority of the male adults of the Bannock and Shoshone tribes of Indians upon the Fort Hall Indian Reservation, in the State of Idaho, which said agreement is as follows:

Whereas the aforesaid commissioners were appointed by the Secretary of the Interior, under and by virtue of an act of Congress, approved June the tenth, eighteen hundred and ninety-six (29 U. S. Stat. L., p. 341), entitled "An act making appropriations for current and contingent expenses of the Indian Bureau of the Interior Department, and fulfilling treaty stipulations with various Indian tribes for the fiscal year ending June the thirtieth, eighteen hundred and ninety-seven, and for other purposes," and by said act were authorized to negotiate with the Bannock and Shoshone Indians, in the State of Idaho, for the cession of part of their surplus lands; and

Whereas the Indians of the Fort Hall Reservation are willing to dispose of part of their surplus lands in the State of Idaho, reserved as a home for them by a treaty concluded at Fort Bridger July the third, eighteen hundred and sixty-eight, and ratified by the United States Senate on the sixteenth day of February, eighteen hundred and sixty-nine, and also by Executive order:

Now, therefore, this agreement, made and entered into by and between the aforesaid commissioners on behalf of the United States of America, and by the headmen and a majority of the male adults of the Bannock and Shoshone tribes of Indians, located on the Fort Hall Indian Reservation, in the State of Idaho. Witnesseth:

ARTICLE I.

That the said Indians of the Fort Hall Reservation do hereby cede, grant, and relinquish to the United States all right, title, and interest which they have to the following-described land, the same being a part of the land obtained through the treaty of Fort Bridger on the third day of July, eighteen hundred and sixty-eight, and ratified by the United States Senate on the sixteenth day of February, eighteen hundred and sixty-nine:

All that portion of the said reservation embraced within and lying east and south of the following-described lines: Commencing at a point in the south boundary of the Fort Hall Indian Reservation, being the southwest corner of township nine (9) south, range thirty-four (34) east of the Boise meridian, thence running due north on the range line between townships 33 and 34 east to a point two (2) miles north of the township line between townships five (5) and six (6) south, thence due east to the range line between ranges 35 and 36 east, thence south on said range line four (4) miles, thence due east to the east boundary line of the reservation; from this point the east and south boundaries of

the said reservation as it now exists to the point of beginning, namely, the southwest corner of township nine (9) south, range thirty-four east, being the remainder of the description and metes and bounds of the said tract of land herein proposed to be ceded.

* * * * *

SEC. 4. That before any of the lands by this agreement ceded are opened to settlement or entry, the Commissioner of Indian Affairs shall cause allotments to be made of such of said lands as are occupied and cultivated by any Indians, as set forth in article three of said agreement, who may desire to have the same allotted to them; and in cases where such Indian occupants prefer to remove to lands within the limits of the reduced reservation, he shall cause to be prepared a schedule of the lands to be abandoned, with a description of the improvements thereon, and the name of the Indian occupant, a duplicate of which shall be filed with the Commissioner of the General Land Office.

Before entry shall be allowed, as hereinafter provided, of any tract of land occupied and cultivated as above and included in the schedule aforesaid, the Secretary of the Interior shall cause the improvements on said tract to be appraised and sold to the highest bidder. No sale of such improvements shall be for less than the appraised value. The purchaser of such improvements shall have thirty days after such purchase for preference right of entry, under the provisions of this Act, of the lands upon which the improvements purchased by him are situated, not to exceed one hundred and sixty acres: *Provided*, That the proceeds of the sale of such improvements shall be paid to the Indians owning the same.

Any Indian electing to abandon the land occupied by him as aforesaid shall have reasonable time, in the discretion of the Secretary of the Interior, within which to remove the improvements situated upon the land occupied by him.

SEC. 5. That on the completion of the allotments and the preparation of the schedule provided for in the preceding section, and the classification of the lands as provided for herein, the residue of said ceded lands shall be opened to settlement by the proclamation of the President, and shall be subject to disposal under the homestead, town-site, stone and timber, and mining laws of the United States only, excepting as to price and excepting the sixteenth and thirty-sixth sections in each Congressional township, which shall be reserved for common-school purposes and be subject to the laws of Idaho: *Provided*, That all purchasers of lands lying under the canal of the Idaho Canal Company, and which are susceptible of irrigation from the water from said canal, shall pay for the same at the rate of ten dollars per acre; all agricultural lands not under said canal shall be paid for at the rate of two dollars and fifty cents per acre, and grazing lands at the rate of one dollar and twenty-five cents per acre, one-fifth of the respective sums to be paid at time of original entry, and four-fifths thereof at the time of making final proof; but no purchaser shall be permitted in any manner to purchase more than one hundred and sixty acres of the land hereinbefore referred to; but the rights of honorably discharged Union soldiers and sailors, as defined and described in sections twenty-three hundred and four and twenty-three hundred and five of the Revised Statutes of the United States, shall not be abridged, except as to the sum to be paid as aforesaid.

The classification as to agricultural and grazing lands shall be made by an employee of the General Land Office under the direction of the Secretary of the Interior.

No lands in sections sixteen and thirty-six now occupied, as set forth in article three of the agreement herein ratified, shall be reserved for school purposes, but the State of Idaho shall be entitled to indemnity for any lands so occupied: *Provided*, That none of said lands shall be disposed of under the town-site laws for less than ten dollars per acre: *And provided further*, That all of said lands within five miles of the boundary line of the town of Pocatello shall be sold at public auction, payable as aforesaid, under the direction of the Secretary of the Interior for not less than ten dollars per acre: *And provided further*, That any mineral lands within said five mile limit shall be disposed of under the mineral land laws of the United States, excepting that the price of such mineral lands shall be fixed at ten dollars per acre instead of the price fixed by the said mineral land laws.

SEC. 6. Whereas David H. Jerome, Alfred M. Wilson, and Warren G. Sayre, duly appointed Commissioners on the part of the United States, did, on the sixth day of October, eighteen hundred and ninety-two, conclude an agreement with the Comanche, Kiowa, and Apache tribes of Indians in Oklahoma, formerly a part of the Indian Territory, which said agreement is in the words and figures as follows:

“Articles of agreement made and entered into at Fort Sill, in the Indian Territory, on the twenty-first day of October, eighteen hundred and ninety-two, by and between David H. Jerome, Alfred M. Wilson, and Warren G. Sayre, Commissioners on the part of the United States, and the Comanche, Kiowa, and Apache tribes of Indians in the Indian Territory.

“ARTICLE I.

“Subject to the allotment of land, in severalty to the individual members of the Comanche, Kiowa, and Apache tribes of Indians in the Indian Territory, as hereinafter provided for, and subject to the setting apart as grazing lands for said Indians, four hundred and eighty thousand acres of land as hereinafter provided for, and subject to the conditions hereinafter imposed, and for the considerations hereinafter mentioned, the said Comanche, Kiowa, and Apache Indians hereby cede, convey, transfer, relinquish, and surrender, forever and absolutely, without any reservation whatever, express or implied, all their claim, title, and interest, of every kind and character, in and to the lands embraced in the following-described tract of country in the Indian Territory to wit: Commencing at a point where the Washita River crosses the ninety-eighth meridian west from Greenwich; thence up the Washita River, in the middle of the main channel thereof, to a point thirty miles, by river, west of Fort Cobb, as now established; thence due west to the north fork of Red River, provided said line strikes said river east of the one-hundredth meridian of west longitude; if not, then only to said meridian line, and thence due south, on said meridian line, to the said north fork of Red River; thence down said north fork, in the middle of the main channel thereof, from the point where it may be first intersected by the lines above described, to the main Red River; thence down said Red River, in the middle of the main channel thereof, to its intersection with the ninety-eighth merid-

ian of longitude west from Greenwich; thence north, on said meridian line, to the place of beginning.

“ARTICLE II.

“Out of the lands ceded, conveyed, transferred, relinquished, and surrendered by Article I hereof, and in part consideration for the cession thereof, it is agreed by the United States that each member of said Comanche, Kiowa, and Apache tribes of Indians over the age of eighteen (18) years shall have the right to select for himself or herself one hundred and sixty (160) acres of land to be held and owned in severalty, to conform to the legal surveys in boundary; and that the father, or, if he be dead, the mother, if members of either of said tribe of Indians, shall have the right to select a like amount of land for each of his or her children under the age of eighteen (18) years; and that the Commissioner of Indian Affairs, or some one by him appointed for the purpose, shall select a like amount of land for each orphan child belonging to either of said tribes under the age of eighteen (18) years.”

* * * * *

That should any of said lands allotted to said Indians, or opened to settlement under this Act, contain valuable mineral deposits, such mineral deposits shall be open to location and entry, under the existing mining laws of the United States, upon the passage of this Act, and the mineral laws of the United States are hereby extended over said lands.

REGULATIONS.

NATURE AND EXTENT OF MINING CLAIMS.

1. Mining claims are of two distinct classes: Lode claims and placers.

LODE CLAIMS.

2. The status of lode claims located or patented previous to the 10th day of May, 1872, is not changed with regard to their extent along the lode or width of surface; but the claim is enlarged by sections 2322 and 2328, by investing the locator, his heirs or assigns, with the right to follow, upon the conditions stated therein, all veins, lodes, or ledges, the top or apex of which lies inside of the surface lines of his claim.

3. It is to be distinctly understood, however, that the law limits the possessory right to veins, lodes, or ledges, *other* than the one named in the original location, to such as were not *adversely claimed on May 10, 1872*, and that where such other vein or ledge was so adversely claimed, at that date the right of the party so adversely claiming is in no way impaired by the provisions of the Revised Statutes.

4. From and after the 10th May, 1872, any person who is a citizen of the United States, or who has declared his intention to become a citizen, may locate, record, and hold a mining claim of *fifteen hundred linear feet* along the course of any mineral vein or lode subject to location; or an association of persons, severally qualified as above, may make joint location of such claim of *fifteen hundred feet*, but in no event can a location of a vein or lode made after the 10th day of May,

1872, exceed fifteen hundred feet along the course thereof, whatever may be the number of persons composing the association.

5. With regard to the extent of surface ground adjoining a vein or lode, and claimed for the convenient working thereof, the Revised Statutes provide that the lateral extents of location of veins or lodes made after May 10, 1872, shall in no case *exceed three hundred feet on each side of the middle of the vein at the surface*, and that no such surface rights shall be limited by any mining regulations to less than twenty-five feet on each side of the middle of the vein at the surface, except where adverse rights existing on the 10th May, 1872, may render such limitation necessary; the end lines of such claims to be in all cases parallel to each other. Said lateral measurements can not extend beyond three hundred feet on *either* side of the middle of the vein at the surface, or such distance as is allowed by local laws. For example: 400 feet can not be taken on one side and 200 feet on the other. If, however, 300 feet on each side are allowed, and by reason of prior claims but 100 feet can be taken on one side, the locator will not be restricted to less than 300 feet on the other side; and when the locator does not determine by exploration *where* the middle of the vein at the surface is, his discovery shaft must be assumed to mark such point.

6. By the foregoing it will be perceived that no lode claim located after the 10th of May, 1872, can exceed a parallelogram fifteen hundred feet in length by six hundred feet in width, but whether surface ground of that width can be taken depends upon the local regulations or State or Territorial laws in force in the several mining districts, and that no such local regulations or State or Territorial laws shall limit a vein or lode claim to less than fifteen hundred feet along the course thereof, whether the location is made by one or more persons, nor can surface rights be limited to less than fifty feet in width unless adverse claims existing on the 10th day of May, 1872, render such lateral limitation necessary.

7. The rights granted to locators under section 2322, Revised Statutes, are restricted to such locations on veins, lodes, or ledges as may be "situated on the *public domain*." In applications for lode claims where the survey conflicts with the survey or location lines of a prior valid lode claim and the ground within the conflicting surveys is excluded, the applicant not only has no right to the excluded ground, but he has no right to that portion of any vein or lode the top or apex of which lies within such excluded ground, unless his location was prior to May 10, 1872. His right to the lode claimed terminates where the lode, in its onward course or strike, intersects the exterior boundary of such excluded ground and passes within it. The end line of his survey should not, therefore, be established beyond such intersection.

8. Where, however, the lode claim for which survey is being made was located prior to the conflicting claim, and such conflict is to be excluded, in order to include all ground not so excluded the end line of the survey may be established within the conflicting lode claim, but the line must be so run as not to extend any farther into such conflicting claim than may be necessary to make such end line parallel to the other end line and at the same time embrace the ground so held and claimed. The useless practice in such cases of extending *both* the side lines of a survey into the conflicting claim and establishing an end line wholly within it, beyond a point necessary under the rule just stated, will be discontinued.

9. Locators can not exercise too much care in defining their locations at the outset, inasmuch as the law requires that all records of mining locations made subsequent to May 10, 1872, shall contain the name or names of the locators, the date of the location, and such a *description of the claim or claims* located by reference to some natural object or permanent monument, as will identify the claim.

10. No lode claim shall be located until after the discovery of a vein or lode within the limits of the claim, the object of which provision is evidently to prevent the appropriation of presumed mineral ground for speculative purposes, to the exclusion of *bona fide* prospectors, before sufficient work has been done to determine whether a vein or lode really exists.

11. The claimant should, therefore, prior to locating his claim, unless the vein can be traced upon the surface, sink a shaft or run a tunnel or drift to a sufficient depth therein to discover and develop a mineral-bearing vein, lode, or crevice; should determine, if possible, the general course of such vein in either direction from the point of discovery, by which direction he will be governed in marking the boundaries of his claim on the surface. His location notice should give the course and distance as nearly as practicable from the discovery shaft on the claim to some permanent, well-known points or objects, such, for instance, as stone monuments, blazed trees, the confluence of streams, point of intersection of well-known gulches, ravines, or roads, prominent buttes, hills, etc., which may be in the immediate vicinity, and which will serve to perpetuate and fix the *locus* of the claim and render it susceptible of identification from the description thereof given in the record of locations in the district, and should be duly recorded.

12. In addition to the foregoing data, the claimant should state the names of adjoining claims, or, if none adjoin, the relative positions of the nearest claims; should drive a post or erect a monument of stones at each corner of his surface ground, and at the point of discovery or discovery shaft should fix a post, stake, or board, upon which should be designated the name of the lode, the name or names of the locators, the number of feet claimed, and in which direction from the point of discovery; it being essential that the location notice filed for record, in addition to the foregoing description, should state whether the entire claim of fifteen hundred feet is taken one side of the point of discovery, or whether it is partly upon one and partly upon the other side thereof, and in the latter case how many feet are claimed upon each side of such discovery point.

13. The location notice must be filed for record in all respects as required by the State or Territorial laws and local rules and regulations, if there be any.

14. In order to hold the possessory title to a mining claim located prior to May 10, 1872, and for which a patent has not been issued, the law requires that *ten dollars* shall be expended annually in labor or improvements on each claim of *one hundred feet* on the course of the vein or lode until a patent shall have been issued therefor; but where a number of such claims are held in common upon the same vein or lode the aggregate expenditure that would be necessary to hold all the claims, at the rate of ten dollars per hundred feet, may be made upon any one claim. The first annual expenditure upon claims of this class should have been performed subsequent to May 10, 1872, and prior to January 1, 1875. From and after January 1, 1875, the required amount must be expended *annually* until patent issues.

15. In order to hold the possessory right to a location made since May 10, 1872, not less than one hundred dollars' worth of labor must be performed or improvements made thereon annually until entry shall have been made. Under the provisions of the act of Congress approved January 22, 1880, the first annual expenditure becomes due and must be performed during the calendar year succeeding that in which the location was made. Expenditure made or labor performed prior to the first day of January succeeding the date of location will not be considered as a part of or applied upon the first annual expenditure required by law.

16. Failure to make the expenditure or perform the labor required upon a location made before or since May 10, 1872, will subject a claim to relocation, unless the original locator, his heirs, assigns, or legal representatives have resumed work after such failure and before relocation.

17. Annual expenditure is not required subsequent to entry, the date of issuing the patent certificate being the date contemplated by statute.

18. Upon the failure of any one of several co-owners of a vein, lode, or ledge, which has not been entered, to contribute his proportion of the expenditures necessary to hold the claim or claims so held in ownership in common, the co-owners who have performed the labor or made the improvements as required by said Revised Statutes may, at the expiration of the year, give such delinquent co-owner personal notice in writing, or notice by publication in the newspaper published nearest the claim for at least once a week for ninety days; and if upon the expiration of ninety days after such notice in writing, or upon the expiration of one hundred and eighty days after the first newspaper publication of notice, the delinquent co-owner shall have failed to contribute his proportion to meet such expenditures or improvements, his interest in the claim by law passes to his co-owners who have made the expenditures or improvements as aforesaid. Where a claimant alleges ownership of a forfeited interest under the foregoing provision, the sworn statement of the publisher as to the facts of publication, giving dates and a printed copy of the notice published, should be furnished, and the claimant must swear that the delinquent co-owner failed to contribute his proper proportion within the period fixed by the statute.

TUNNELS.

19. The effect of section 2323, Revised Statutes, is simply to give the proprietors of a mining tunnel run in good faith the possessory right to fifteen hundred feet of any blind lodes cut, discovered, or intersected by such tunnel, which were not previously known to exist, within three thousand feet from the face or point of commencement of such tunnel, and to prohibit other parties, after the commencement of the tunnel, from prospecting for and making locations of lodes on the *line thereof* and within said distance of three thousand feet, unless such lodes appear upon the surface or were previously known to exist.

20. The term "face" as used in said section is construed and held to mean the first working face formed in the tunnel, and to signify the point at which the tunnel actually enters cover, it being from this point that the three thousand feet are to be counted upon which prospecting is prohibited as aforesaid.

21. To avail themselves of the benefits of this provision of law, the proprietors of a mining tunnel will be required, at the time they enter cover as aforesaid, to give proper notice of their tunnel location by erecting a substantial post, board, or monument at the face or point of commencement thereof, upon which should be posted a good and sufficient notice, giving the names of the parties or company claiming the tunnel right; the actual or proposed course or direction of the tunnel; the height and width thereof; and the course and distance from such face or point of commencement to some permanent well-known objects in the vicinity by which to fix and determine the locus in manner heretofore set forth applicable to locations of veins or lodes; and at the time of posting such notice they shall, in order that miners or prospectors may be enabled to determine whether or not they are within the lines of the tunnel, establish the boundary lines thereof, by stakes or monuments placed along such lines at proper intervals, to the terminus of the three thousand feet from the face or point of commencement of the tunnel; and the lines so marked will define and govern as to the specific boundaries within which prospecting for lodes not previously known to exist is prohibited while work on the tunnel is being prosecuted with reasonable diligence.

22. At the time of posting notice and marking out the lines of the tunnel as aforesaid, a full and correct copy of such notice of location defining the tunnel claim must be filed for record with the mining recorder of the district, to which notice must be attached the sworn statement or declaration of the owners, claimants, or projectors of such tunnel, setting forth the facts in the case; stating the amount expended by themselves and their predecessors in interest in prosecuting work thereon; the extent of the work performed, and that it is *bona fide* their intention to prosecute work on the tunnel so located and described with reasonable diligence for the development of a vein or lode, or for the discovery of mines, or both, as the case may be. This notice of location must be duly recorded, and, with the said sworn statement attached, kept on the recorder's files for future reference.

23. By a compliance with the foregoing much needless difficulty will be avoided, and the way for the adjustment of legal rights acquired in virtue of said section 2323 will be made much more easy and certain.

24. This office will take particular care that no improper advantage is taken of this provision of law by parties making or professing to make tunnel locations, ostensibly for the purposes named in the statute, but really for the purpose of monopolizing the lands lying in front of their tunnels to the detriment of the mining interests and to the exclusion of *bona fide* prospectors or miners, but will hold such tunnel claimants to a strict compliance with the terms of the statutes; and a *reasonable diligence* on their part in prosecuting the work is one of the essential conditions of their implied contract. Negligence or want of due diligence will be construed as working a forfeiture of their right to all undiscovered veins on the line of such tunnel.

PLACER CLAIMS.

25. But one discovery of mineral is required to support a placer location, whether it be of twenty acres by an individual, or of one hundred and sixty acres or less by an association of persons.

26. The act of August 4, 1892, extends the mineral land laws so as to

bring lands chiefly valuable for building stone within the provisions of said law, by authorizing a placer entry of such lands. It does not operate, however, to withdraw lands chiefly valuable for building stone from entry under any existing law applicable thereto. Registers and receivers should therefore make a reference to said act on the entry papers in the case of all placer entries made for lands containing stone chiefly valuable for building purposes. It will be noted that lands reserved for the benefit of public schools or donated to any State are not subject to entry under said act.

27. It is to be observed that the provisions of the mineral laws relating to placers are extended by the act of February 11, 1897, so as to allow the location and entry thereunder of public lands chiefly valuable for petroleum or other mineral oils, and entries of that nature made prior to the passage of said act are to be considered as though made thereunder.

28. By section 2330 authority is given for the subdivision of forty-acre legal subdivisions into *ten-acre* lots, which is intended for the greater convenience of miners in segregating their claims both from one another and from intervening agricultural lands.

29. It is held, therefore, that under a proper construction of the law these ten-acre lots in mining districts should be considered and dealt with, to all intents and purposes, as legal subdivisions, and that an applicant having a legal claim which conforms to one or more of these ten-acre lots, either adjoining or cornering, may make entry thereof, after the usual proceedings, without further survey or plat.

30. In cases of this kind, however, the notice given of the application must be very specific and accurate in description, and as the forty-acre tracts may be subdivided into ten-acre lots, either in the form of squares of ten by ten chains, or, if parallelograms, five by twenty chains, so long as the lines are parallel and at right angles with the lines of the public surveys, it will be necessary that the notice and application state specifically what ten-acre lots are sought to be patented in addition to the other *data* required in the notice.

31. Where the ten-acre subdivision is in the form of a square it may be described, for instance, as the "SE. $\frac{1}{4}$ of the SW. $\frac{1}{4}$ of the NW. $\frac{1}{4}$," or, if in the form of a parallelogram as aforesaid, it may be described as the "W. $\frac{1}{2}$ of the W. $\frac{1}{2}$ of the SW. $\frac{1}{4}$ of the NW. $\frac{1}{4}$ (or the N. $\frac{1}{2}$ of the S. $\frac{1}{2}$ of the NE. $\frac{1}{4}$ of the SE. $\frac{1}{4}$) of section ———, township ———, range ———," as the case may be; but, in addition to this description of the land, the notice must give all the other *data* that is required in a mineral application, by which parties may be put on inquiry as to the premises sought to be patented. The proofs submitted with applications for claims of this kind must show clearly the character and the extent of the improvements upon the premises.

The proof of improvements must show their value to be not less than *five hundred dollars* and that they were made by the applicant for patent or his grantors. The annual expenditure to the amount of \$100, required by section 2324, Revised Statutes, must be made upon placer claims as well as lode claims.

32. Applicants for patent to a placer claim, who are also in possession of a known vein or lode included therein, must state in their application that the placer includes such vein or lode. The published and posted notices must also include such statement. If veins or lodes lying within a placer location are owned by other parties, the fact

should be distinctly stated in the application for patent, and in all the notices. But in all cases, whether the lode is claimed or excluded, it must be surveyed and marked upon the plat, the field notes and plat giving the area of the lode claim or claims and the area of the placer separately. It should be remembered that an application which omits to include an application for a known vein or lode therein must be construed as a conclusive declaration that the applicant has no right of possession to the vein or lode. Where there is no known lode or vein, the fact must appear by the affidavit of two or more witnesses.

33. By section 2330 it is declared that no location of a placer claim made after July 9, 1870, shall exceed one hundred and sixty acres for any one person or association of persons, which location shall conform to the United States surveys.

34. Section 2331 provides that all placer-mining claims located after May 10, 1872, shall conform as nearly as practicable with the United States systems of public surveys and the subdivisions of such surveys, and no such locations shall include more than twenty acres for each individual claimant.

35. The foregoing provisions of law are construed to mean that after the 9th day of July, 1870, no location of a placer claim can be made to exceed one hundred and sixty acres, whatever may be the number of locators associated together, or whatever the local regulations of the district may allow; and that from and after May 10, 1872, no location can exceed twenty acres for each individual participating therein; that is, a location by two persons can not exceed forty acres, and one by three persons can not exceed sixty acres.

36. The regulations hereinbefore given as to the manner of marking locations on the ground, and placing the same on record, must be observed in the case of placer locations so far as the same are applicable, the law requiring, however, that where placer claims are upon *surveyed* public lands the locations must hereafter be made to conform to legal subdivisions thereof as near as practicable.

PROCEDURE TO OBTAIN PATENT TO MINERAL LANDS.

37. As a condition for the making of application for patent according to section 2325, there must be a preliminary showing of work or expenditure upon each location, either by showing the full amount sufficient to the maintenance of possession under section 2324 for the pending year, or, if there has been failure, it should be shown that work has been resumed so as to prevent relocation by adverse parties after abandonment.

The "pending year" means the calendar year in which application is made, and has no reference to a showing of work at date of the final entry.

38. This preliminary showing may, where the matter is unquestioned, consist of the affidavit of two or more witnesses familiar with the facts.

39. The claimant is required, in the first place, to have a correct survey of his claim made under authority of the surveyor-general of the State or Territory in which the claim lies, such survey to show with accuracy the exterior surface boundaries of the claim, which boundaries are required to be distinctly marked by monuments on the ground. Four plats and one copy of the original field notes in each case will be prepared by the surveyor-general; one plat and the original field notes

to be retained in the office of the surveyor-general, one copy of the plat to be given the claimant for posting upon the claim, one plat and a copy of the field notes to be given the claimant for filing with the proper register, to be finally transmitted by that officer, with other papers in the case, to this office, and one plat to be sent by the surveyor-general to the register of the proper land district, to be retained on his files for future reference. As there is no resident surveyor-general for the State of Arkansas, applications for the survey of mineral claims in said State should be made to the Commissioner of this office, who, under the law, is *ex officio* the U. S. surveyor-general.

40. The survey and plat of mineral claims required to be filed in the proper land office with application for patent must be made subsequent to the recording of the location of the claim (if the laws of the State or Territory or the regulations of the mining district require the notice of location to be recorded), and when the original location is made by survey of a United States deputy surveyor such location survey can not be substituted for that required by the statute, as above indicated.

41. The surveyors-general should designate all surveyed mineral claims by a progressive series of numbers, beginning with survey No. 37, irrespective as to whether they are situated on surveyed or unsurveyed lands, the claim to be so designated at date of issuing the order therefor. In addition to the local designation of the claim, it being required in all cases that the plat and field notes of the survey of a claim must, in addition to the reference to permanent objects in the neighborhood, describe the locus of the claim with reference to the lines of public surveys by a line connecting a corner of the claim with the nearest public corner of the United States surveys, unless such claim be on unsurveyed lands at a distance of more than two miles from such public corner, in which latter case it should be connected with a United States mineral monument. Such connecting line must not be more than *two miles* in length and should be measured on the ground direct between the points, or calculated from actually surveyed traverse lines if the nature of the country should not permit direct measurement. If a regularly established survey corner is within two miles of a claim situated on unsurveyed lands, the connection should be made with such corner in preference to a connection with a United States mineral monument. The connecting line must be surveyed by the deputy mineral surveyor at the time of his making the particular survey, and be made a part thereof.

42. Upon the approval of the survey of a mining claim made upon surveyed lands the surveyor-general will prepare and transmit to the local land office and to this office a diagram tracing showing the portions of legal 40-acre subdivisions made fractional by reason of the mineral survey, designating each of such portions by the proper lot number, beginning with No. 1 in each section, and giving the area of each lot.

43. The following particulars should be observed in the survey of every mining claim:

(1) The exterior boundaries of the claim, the number of feet claimed along the vein, and, as nearly as can be ascertained, the direction of the vein, and the number of feet claimed on the vein in each direction from the point of discovery or other well-defined place on the claim should be represented on the plat of survey and in the field notes.

(2) The intersection of the lines of the survey with the lines of conflicting prior surveys should be noted in the field notes and represented upon the plat.

(3) Conflicts with unsurveyed claims, where the applicant for survey does not claim the area in conflict, should be shown by actual survey.

(4) The total area of the claim embraced by the exterior boundaries should be stated, and also the area in conflict with each intersecting survey, substantially as follows:

	Acres.
Total area of claim	10. 50
Area in conflict with survey No. 302	1. 56
Area in conflict with survey No. 948	2. 33
Area in conflict with Mountain Maid lode mining claim, unsurveyed	1. 48

It does not follow that because mining surveys are required to exhibit all conflicts with prior surveys the areas of conflict are to be excluded. The field notes and plat are made a part of the application for patent, and care should be taken that the description does not inadvertently exclude portions intended to be retained. It is better that the application for patent should state the portions to be excluded in express terms.

44. The claimant is then required to post a copy of the plat of such survey in a conspicuous place upon the claim, together with notice of his intention to apply for a patent therefor, which notice will give the date of posting, the name of the claimant, the name of the claim, the number of the survey, the mining district and county, and the names of adjoining and conflicting claims as shown by the plat of survey. Too much care can not be exercised in the preparation of this notice, inasmuch as the data therein are to be repeated in the other notices required by the statute, and upon the accuracy and completeness of these notices will depend, in a great measure, the regularity and validity of the proceedings for patent.

45. After posting the said plat and notice upon the premises, the claimant will file with the proper register and receiver a copy of such plat and the field notes of survey of the claim, accompanied by the affidavit of at least two credible witnesses that such plat and notice are posted conspicuously upon the claim, giving the date and place of such posting, a copy of the *notice* so posted to be attached to and form a part of said affidavit.

46. Accompanying the field notes so filed must be the sworn statement of the claimant that he has the possessory right to the premises therein described, in virtue of a compliance by himself (and by his grantors, if he claims by purchase) with the mining rules, regulations, and customs of the mining district, State, or Territory in which the claim lies, and with the mining laws of Congress, such sworn statement to narrate briefly, but as clearly as possible, the facts constituting such compliance, the origin of his possession, and the basis of his claim to a patent.

47. This sworn statement must be supported by a copy of the location notice, certified by the officer in charge of the records where the same is recorded, and where the applicant for patent claims the interests of others associated with him in making the location, or only as purchaser, in addition to the copy of the location notice, must be furnished a complete abstract of title as shown by the record in the office where the transfers are by law required to be recorded, certified to by

the officer in charge of the record, under his official seal. The officer should also certify that no conveyances affecting the title to the claim in question appear of record other than those set forth in the abstract, which abstract shall be brought down to the date of the application for patent. Where the applicant claims as sole locator, his affidavit should be furnished to the effect that he has disposed of no interest in the land located.

48. In the event of the mining records in any case having been destroyed by fire or otherwise lost, affidavit of the fact should be made, and secondary evidence of possessory title will be received, which may consist of the affidavit of the claimant, supported by those of any other parties cognizant of the facts relative to his location, occupancy, possession, improvements, &c.; and in such case of lost records, any deeds, certificates of location or purchase, or other evidence which may be in the claimant's possession and tend to establish his claim, should be filed.

49. Before receiving and filing a mineral application for patent, local officers will be particular to see that it includes no land which is embraced in a prior or pending application for patent or entry, or for any lands embraced in a railroad selection, or for which publication is pending or has been made by any other claimants, and if, in their opinion, after investigation, it should appear that a mineral application should not, for these or other reasons, be accepted and filed, they should formally reject the same, giving the reasons therefor, and allow the applicant thirty days for appeal to this office under the Rules of Practice.

50. Upon the receipt of these papers, if no reason appears for rejecting the application, the register will, at the expense of the claimant (who must furnish the agreement of the publisher to hold applicant for patent alone responsible for charges of publication), publish a notice of such application for the period of sixty days in a newspaper published nearest to the claim, and will post a copy of such notice in his office for the same period. When the notice is published in a *weekly* newspaper, nine consecutive insertions are necessary; when in a *daily* newspaper, the notice must appear in each issue for sixty-one consecutive issues. In both cases the first day of issue must be excluded in estimating the period of sixty days.

51. The notices so published and posted must embrace all the data given in the notice posted upon the claim. In addition to such data the published notice must further indicate the locus of the claim by giving the connecting line, as shown by the field notes and plat, between a corner of the claim and a United States mineral monument or a corner of the public survey, and thence the boundaries of the claim by courses and distances.

52. The register shall publish the notice of application for patent in a paper of established character and general circulation, to be by him designated as being the newspaper published nearest the land.

53. The claimant at the time of filing the application for patent, or at any time within the sixty days of publication, is required to file with the register a certificate of the surveyor-general that not less than five hundred dollars' worth of labor has been expended or improvements made, by the applicant or his grantors, upon each location embraced in the application, or if the application embraces several locations held in common, that an amount equal to five hundred dollars

for each location has been so expended upon, and for the benefit of, the entire group; that the plat filed by the claimant is correct; that the field notes of the survey, as filed, furnish such an accurate description of the claim as will if incorporated in a patent serve to fully identify the premises, and that such reference is made therein to natural objects or permanent monuments as will perpetuate and fix the locus thereof: *Provided*, That as to all applications for patent made and passed to entry before July 1, 1898, or which are by protests or adverse claims prevented from being passed to entry before that time, where the application embraces several locations held in common, proof of an expenditure of five hundred dollars upon the group will be sufficient and an expenditure of that amount need not be shown to have been made upon, or for the benefit of, each location embraced in the application.

54. The surveyor-general may derive his information upon which to base his certificate as to the value of labor expended or improvements made from his deputy who makes the actual survey and examination upon the premises, and such deputy should specify with particularity and full detail the character and extent of such improvements.

55. It will be the more convenient way to have this certificate indorsed by the surveyor-general, both upon the plat and field notes of survey filed by the claimant as aforesaid.

56. After the sixty days' period of newspaper publication has expired, the claimant will furnish from the office of publication a sworn statement that the notice was published for the statutory period, giving the first and last day of such publication, and his own affidavit showing that the plat and notice aforesaid remained conspicuously posted upon the claim sought to be patented during said sixty days' publication, giving the dates.

57. Upon the filing of this affidavit the register will, if no adverse claim was filed in his office during the period of publication, permit the claimant to pay for the land according to the area given in the plat and field notes of survey aforesaid, at the rate of five dollars for each acre and five dollars for each fractional part of an acre, except as otherwise provided by law, the receiver issuing the usual duplicate receipt therefor. The claimant will also make a sworn statement of all charges and fees paid by him for publication and surveys, together with all fees and money paid the register and receiver of the land office, after which the complete record will be forwarded to the Commissioner of the General Land Office and a patent issued thereon if found regular.

58. At any time prior to the issuance of patent, protest may be filed against the patenting of the claim as applied for, upon any ground tending to show that the applicant has failed to comply with the law in a matter which would avoid the claim. Such protest can not, however, be made the means of preserving a surface conflict lost by failure to adverse or lost by the judgment of the court in an adverse suit. One holding a present joint interest in a mineral location included in an application for patent who is excluded from the application, so that his interest would not be protected by the issue of patent thereon, may protest against the issuance of a patent as applied for, setting forth in such protest the nature and extent of his interest in such location, and such a protestant will be deemed a party in interest entitled to appeal. This results from the holding that a co-owner excluded from an application for patent does not have an "adverse" claim within the meaning

of sections 2325 and 2326 of the Revised Statutes. See Turner v. Sawyer, 150 U. S., 578-586.

59. Any party applying to make entry as *trustee* must disclose fully the nature of the trust and the name of the *cestui que trust*; and such trustee, as well as the beneficiaries, must furnish satisfactory proof of citizenship; and the names of beneficiaries, as well as that of the trustee, must be inserted in the final certificate of entry.

60. The proceedings to obtain patents for claims usually called placers, including all forms of deposit excepting veins of quartz or other rock in place, are similar to the proceedings prescribed for obtaining patents for vein or lode claims; but where said placer claim shall be upon surveyed lands, and conforms to legal subdivisions, no further survey or plat will be required; and all placer-mining claims located after May 10, 1872, shall conform as nearly as practicable with the United States system of public-land surveys and the rectangular subdivisions of such surveys, and no such location shall include more than twenty acres for each individual claimant; but where placer claims can not be conformed to legal subdivisions, survey and plat shall be made as on unsurveyed lands. But where such claims are located previous to the public surveys, and do not conform to legal subdivisions, survey, plat, and entry thereof may be made according to the boundaries thereof, provided the location is in all respects legal.

61. The proceedings for obtaining patents for veins or lodes having already been fully given, it will not be necessary to repeat them here, it being thought that careful attention thereto by applicants and the local officers will enable them to act understandingly in the matter, and make such slight modifications in the notice, or otherwise, as may be necessary in view of the different nature of the two classes of claims; placer claims being fixed, however, at two dollars and fifty cents per acre, or fractional part of an acre.

62. The first care in recognizing an application for patent upon a placer claim must be exercised in determining the exact classification of the lands. To this end the clearest evidence of which the case is capable should be presented.

(1) If the claim be all placer ground, that fact must be stated in the application and corroborated by accompanying proofs; if of mixed placers and lodes, it should be so set out, with a description of all known lodes situated within the boundaries of the claim. A specific declaration, such as is required by section 2333, Revised Statutes, must be furnished as to each lode intended to be claimed. All other known lodes are, by the silence of the applicant, excluded by law from all claim by him, of whatsoever nature, possessory or otherwise.

(2) Deputy surveyors shall, at the expense of the parties, make full examination of all placer claims surveyed by them, and duly note the facts as specified in the law, stating the quality and composition of the soil, the kind and amount of timber and other vegetation, the locus and size of streams, and such other matters as may appear upon the surface of the claim. This examination should include the character and extent of all surface and underground workings, whether placer or lode, for mining purposes.

(3) In addition to these data, which the law requires to be shown in all cases, the deputy should report with reference to the proximity of centers of trade or residence; also of well-known systems of lode deposits or of individual lodes. He should also report as to the use or

adaptability of the claim for placer mining; whether water has been brought upon it in sufficient quantity to mine the same, or whether it can be procured for that purpose; and, finally, what works or expenditures have been made by the claimant or his grantors for the development of the claim, and their situation and location with respect to the same as applied for.

(4) This examination should be reported by the deputy under oath to the surveyor-general, and duly corroborated; and a copy of the same should be furnished with the application for patent to the claim, constituting a part thereof, and included in the oath of the applicant.

(5) Applications awaiting entry, whether published or not, must be made to conform to these regulations, with respect to examination as to the character of the land. Entries already made will be suspended for such additional proofs as may be deemed necessary in each case.

MILL SITES.

63. Land entered as a mill site must be shown to be nonmineral. Mill sites are simply auxiliary to the working of mineral claims, and as section 2337, which provides for the patenting of mill sites, is embraced in the chapter of the Revised Statutes relating to mineral lands, they are therefore included in this circular.

64. To avail themselves of this provision of law parties holding the possessory right to a vein or lode, and to a piece of nonmineral land not contiguous thereto for mining or milling purposes, not exceeding the quantity allowed for such purpose by section 2337, or prior laws, under which the land was appropriated, the proprietors of such vein or lode may file in the proper land office their application for a patent, under oath, in manner already set forth herein, which application, together with the plat and field notes, may include, embrace, and describe, in addition to the vein or lode, such noncontiguous mill site, and after due proceedings as to notice, etc., a patent will be issued conveying the same as one claim. The owner of a patented lode may, by an independent application, secure a mill site if good faith is manifest in its use or occupation in connection with the lode and no adverse claim exists.

65. Where the original survey includes a lode claim and also a mill site the lode claim should be described in the plat and field notes as "Sur. No. 37, A," and the mill site as "Sur. No. 37, B," or whatever may be its appropriate numerical designation; the course and distance from a corner of the mill site to a corner of the lode claim to be invariably given in such plat and field notes, and a copy of the plat and notice of application for patent must be conspicuously posted upon the mill site as well as upon the vein or lode for the statutory period of sixty days. In making the entry no separate receipt or certificate need be issued for the mill site, but the whole area of both lode and mill site will be embraced in one entry, the price being five dollars for each acre and fractional part of an acre embraced by such lode and mill site claim.

66. In case the owner of a quartz mill or reduction works is not the owner or claimant of a vein or lode the law permits him to make application therefor in the same manner prescribed herein for mining claims, and after due notice and proceedings, in the absence of a valid adverse filing, to enter and receive a patent for his mill site at said price per acre.

67. In every case there must be satisfactory proof that the land claimed as a mill site is not mineral in character, which proof may, where the matter is unquestioned, consist of the sworn statement of two or more persons capable, from acquaintance with the land, to testify understandingly.

68. The proof necessary to establish the citizenship of applicants for mining patents must be made in the following manner: In case of an incorporated company, a certified copy of their charter or certificate of incorporation must be filed. In case of an association of persons unincorporated, the affidavit of their duly authorized agent, made upon his own knowledge or upon information and belief, setting forth the residence of each person forming such association, must be submitted. This affidavit must be accompanied by a power of attorney from the parties forming such association, authorizing the person who makes the affidavit of citizenship to act for them in the matter of their application for patent.

69. In case of an individual or an association of individuals who do not appear by their duly authorized agent, you will require the affidavit of each applicant, showing whether he is a native or naturalized citizen, when and where born, and his residence.

70. In case an applicant has declared his intention to become a citizen or has been naturalized, his affidavit must show the date, place, and the court before which he declared his intention, or from which his certificate of citizenship issued, and present residence.

71. The affidavit of the claimant as to his citizenship may be taken before the register or receiver, or any other officer authorized to administer oaths within the land district; or, if the claimant is residing beyond the limits of the district, the affidavit may be taken before the clerk of any court of record or before any notary public of any State or Territory.

72. If citizenship is established by the testimony of disinterested persons, such testimony may be taken at any place before any person authorized to administer oaths, and whose official character is duly verified.

73. In sending up the papers in the case the register must not omit certifying to the fact that the notice was posted in his office for the full period of sixty days, such certificate to state distinctly when such posting was done and how long continued. The plat forwarded as part of the proof should not be *folded*, but *rolled*, so as to prevent creasing, and either transmitted in a separate package or so enclosed with the other papers that it may pass through the mails without creasing or mutilation. If forwarded separately, the letter transmitting the papers should state the fact.

74. No entry will be allowed until the register has satisfied himself, by a careful examination, that proper proofs have been filed upon all the points indicated in official regulations in force and that they show a sufficient *bona fide* compliance with the laws and such regulations.

75. The consecutive series of numbers of mineral entries must be continued, whether the same are of lode or placer claims or mill sites.

POSSESSORY RIGHT.

76. The provisions of section 2332, Revised Statutes, will greatly lessen the burden of proof, more especially in the case of old claims located many years since, the records of which, in many cases, have

been destroyed by fire, or lost in other ways during the lapse of time, but concerning the possessory right to which all controversy or litigation has long been settled.

77. When an applicant desires to make his proof of possessory right in accordance with this provision of law, he will not be required to produce evidence of location, copies of conveyances, or abstracts of title, as in other cases, but will be required to furnish a duly certified copy of the statute of limitation of mining claims for the State or Territory, together with his sworn statement giving a clear and succinct narration of the facts as to the origin of his title, and likewise as to the continuation of his possession of the mining ground covered by his application; the area thereof; the nature and extent of the mining that has been done thereon; whether there has been any opposition to his possession, or litigation with regard to his claim and, if so, when the same ceased; whether such cessation was caused by compromise or by judicial decree, and any additional facts within the claimant's knowledge having a direct bearing upon his possession and bona fides which he may desire to submit in support of his claim.

78. There should likewise be filed a certificate, under seal of the court having jurisdiction of mining cases within the judicial district embracing the claim, that no suit or action of any character whatever involving the right of possession to any portion of the claim applied for is pending, and that there has been no litigation before said court affecting the title to said claim or any part thereof for a period equal to the time fixed by the statute of limitations for mining claims in the State or Territory as aforesaid, other than that which has been finally decided in favor of the claimant.

79. The claimant should support his narrative of facts relative to his possession, occupancy, and improvements by corroborative testimony of any disinterested person or persons of credibility who may be cognizant of the facts in the case and are capable of testifying understandingly in the premises.

ADVERSE CLAIMS.

80. An adverse mining claim must be filed with the register and receiver of the land office where the application for patent was filed, or with the register and receiver of the district in which the land is situated at the time of filing the adverse claim. It must be on the oath of the adverse claimant, or it may be verified by the oath of any duly authorized agent or attorney in fact of the adverse claimant cognizant of the facts stated.

81. Where an agent or attorney in fact verifies the adverse claim, he must distinctly swear that he is such agent or attorney and accompany his affidavit by proof thereof.

82. The agent or attorney in fact must make the affidavit in verification of the adverse claim within the land district where the claim is situated.

83. The adverse notice must fully set forth the nature and extent of the interference or conflict; whether the adverse party claims as a purchaser for valuable consideration or as a locator; if the former, a certified copy of the original location, the original conveyance, a duly certified copy thereof, or an abstract of title from the office of the proper recorder should be furnished; or if the transaction was a merely verbal one, he will narrate the circumstances attending the purchase, the

date thereof, and the amount paid, which facts should be supported by the affidavit of one or more witnesses, if any were present at the time; and if he claims as a locator, he must file a duly certified copy of the location from the office of the proper recorder.

84. In order that the "*boundaries*" and "*extent*" of the claim may be shown, it will be incumbent upon the adverse claimant to file a plat showing his entire claim, its relative situation or position with the one against which he claims, and the extent of the conflict: *Provided, however*, That if the application for patent describes the claim by legal subdivisions, the adverse claimant, if also claiming by legal subdivisions, may describe his adverse claim in the same manner without further survey or plat. If the claim is not described by legal subdivisions, it will generally be more satisfactory if the plat thereof is made from an actual survey by a deputy mineral surveyor and its correctness officially certified thereon by him.

85. Upon the foregoing being filed within the sixty days' publication, the register, or in his absence the receiver, will give notice in writing to *both parties* to the contest that such adverse claim has been filed, informing them that the party who filed the adverse claim will be required within thirty days from the date of such filing to commence proceedings in a court of competent jurisdiction to determine the question of right of possession, and to prosecute the same with reasonable diligence to final judgment, and that, should such adverse claimant fail to do so, his adverse claim will be considered waived, and the application for patent be allowed to proceed upon its merits.

86. When an adverse claim is filed as aforesaid, the register or receiver will indorse upon the same the precise date of filing, and preserve a record of the date of notifications issued thereon; and thereafter all proceedings on the application for patent will be suspended, with the exception of the completion of the publication and posting of notices and plat, and the filing of the necessary proof thereof, until the controversy shall have been adjudicated in court, or the adverse claim waived or withdrawn.

87. Where an adverse claim has been filed and suit thereon commenced within the statutory period, and final judgment determining the right of possession rendered in favor of the applicant, it will not be sufficient for him to file with the register a certificate of the clerk of the court, setting forth the facts as to such judgment, but he must, before he is allowed to make entry, file a certified copy of the judgment, together with the other evidence required by section 2326, Revised Statutes.

88. Where such suit has been dismissed, a certificate of the clerk of the court to that effect or a certified copy of the order of dismissal will be sufficient.

89. After an adverse claim has been filed and suit commenced, a relinquishment or other evidence of abandonment will not be accepted, but the case must be terminated and proof thereof furnished as required by the last two paragraphs.

90. Where an adverse claim has been filed, but no suit commenced against the applicant for patent within the statutory period, a certificate to that effect by the clerk of the State court having jurisdiction in the case, and also by the clerk of the circuit court of the United States for the district in which the claim is situated, will be required.

APPOINTMENT OF DEPUTIES FOR SURVEY OF MINING CLAIMS—CHARGES FOR SURVEYS AND PUBLICATIONS—FEES OF REGISTERS AND RECEIVERS, ETC.

91. Section 2334 provides for the appointment of surveyors of mineral claims, and authorizes the Commissioner of the General Land Office to establish the rates to be charged for surveys and for newspaper publications. Under this authority of law the following rates have been established as the maximum charges for newspaper publications in mining cases:

(1) Where a daily newspaper is designated the charge shall not exceed seven dollars for each ten lines of space occupied, and where a weekly newspaper is designated as the medium of publication five dollars for the same space will be allowed. Such charge shall be accepted as full payment for publication in each issue of the newspaper for the entire period required by law.

It is expected that these notices shall not be so abbreviated as to curtail the description essential to a perfect notice, and the said rates established upon the understanding that they are to be in the usual body type used for advertisements.

(2) For the publication of citations in contests or hearings involving the character of lands the charges shall not exceed eight dollars for five publications in weekly newspapers or ten dollars for publications in daily newspapers for thirty days.

92. The surveyors-general of the several districts will, in pursuance of said law, appoint in each land district as many *competent* deputies for the survey of mining claims as may seek such appointment, it being distinctly understood that all expenses of these notices and surveys are to be borne by the mining claimants and not by the United States. The claimant may employ *any* deputy surveyor within such district to do his work in the field. Each deputy mineral surveyor before entering upon the duties of his office or appointment shall be required to enter into such bond for the faithful performance of his duties as may be prescribed by the regulations of the land department in force at that time.

93. With regard to the *platting* of the claim and other *office work* in the surveyor-general's office, that officer will make an estimate of the cost thereof, which amount the claimant will deposit with any assistant United States treasurer or designated depository in favor of the United States Treasurer, to be passed to the credit of the fund created by "individual depositors for surveys of the public lands," and file with the surveyor-general duplicate certificates of such deposit in the usual manner.

94. The surveyors-general will endeavor to appoint mineral deputy surveyors, so that one or more may be located in each mining district for the greater convenience of miners.

95. The usual oaths will be required of these deputies and their assistants as to the correctness of each survey executed by them.

The duty of the deputy mineral surveyor ceases when he has executed the survey and returned the field notes and preliminary plat thereof with his report to the surveyor-general. He will not be allowed to prepare for the mining claimant the papers in support of an application for patent, or otherwise perform the duties of an attorney before the land office in connection with a mining claim.

The surveyors-general and local land officers are expected to report any infringement of this regulation to this office.

96. Should it appear that excessive or exorbitant charges have been made by any surveyor or any publisher, prompt action will be taken with the view of correcting the abuse.

97. The fees payable to the register and receiver for filing and acting upon applications for mineral-land patents are five dollars to each officer, to be paid by the applicant for patent at the time of filing, and the like sum of five dollars is payable to each officer by an adverse claimant at the time of filing his adverse claim. (Sec. 2238, R. S., paragraph 9.)

98. At the time of payment of fee for mining application or adverse claim the receiver will issue his receipt therefor in duplicate, one to be given the applicant or adverse claimant, as the case may be, and one to be forwarded to the Commissioner of the General Land Office *on the day of issue*. The receipt for mining application should have attached the certificate of the register that the lands included in the application are vacant lands subject to such appropriation.

99. The register and receiver will, at the close of each month, forward to this office an abstract of mining applications filed, and a register of receipts, accompanied with an abstract of mineral lands sold, and an abstract of adverse claims filed.

100. The fees and purchase money received by registers and receivers must be placed to the credit of the United States in the receiver's monthly and quarterly account, charging up in the disbursing account the sums to which the register and receiver may be respectively entitled as fees and commissions, with limitations in regard to the legal maximum.

HEARINGS TO DETERMINE CHARACTER OF LANDS.

101. The rules of practice in cases before the United States district land offices, the General Land Office, and the Department of the Interior will, so far as applicable, govern in all cases and proceedings arising in contests and hearings to determine the mineral character of lands.

102. No public land shall be withheld from entry as agricultural land on account of its mineral character, except such as is returned by the surveyor-general as mineral; and the presumption arising from such a return may be overcome by testimony taken in the manner hereinafter described.

103. Hearings to determine the character of lands are practically of two kinds, as follows:

(1) Lands returned as mineral by the surveyor-general.

When such lands are sought to be entered as agricultural under laws which require the submission of final proof after due notice by publication and posting, the filing of the proper nonmineral affidavit in the absence of allegations that the land is mineral will be deemed sufficient as a preliminary requirement. A satisfactory showing as to character of land must be made when final proof is submitted.

In case of application to enter, locate, or select such lands as agricultural, under laws in which the submission of final proof after due publication and posting is *not* required, notice thereof must first be given by publication for sixty days and posting in the local office dur-

ing the same period, and affirmative proof as to the character of the land submitted. In the absence of allegations that the land is mineral, and upon compliance with this requirement, the entry, location, or selection will be allowed, if otherwise regular.

(2) Lands returned as agricultural and alleged to be mineral in character.

Where as against the claimed right to enter such lands as agricultural it is alleged that the same are mineral, or are applied for as mineral lands, the proceedings in this class of cases will be in the nature of a contest, and the practice will be governed by the rules in force in contest cases.

104. Where a railroad company seeks to select lands not returned as mineral, but within six miles of any mining location, claim, or entry, or where, in the case of a selection by a State, the lands sought to be selected are within a township in which there is a mining location, claim, or entry, publication must be made of the lands selected at the expense of the railroad company or State for a period of sixty days, with posting for the same period in the land office for the district in which the lands are situated, during which period of publication the local land officers will receive protests or contests for any of said tracts or subdivisions of lands claimed to be more valuable for mining than for agricultural purposes.

105. At the expiration of the period of publication the register and receiver will forward to the Commissioner of the General Land Office the published list, noting thereon any protests, or contests, or suggestions as to the mineral character of any such lands, together with any information they may have received as to the mineral character of any of the lands mentioned in said list, when a hearing may be ordered.

106. At the hearings under either of the aforesaid classes the claimants and witnesses will be thoroughly examined with regard to the character of the land; whether the same has been thoroughly prospected; whether or not there exists within the tract or tracts claimed any lode or vein of quartz or other rock in place bearing gold, silver, cinnabar, lead, tin, or copper, or other valuable deposit which has ever been claimed, located, recorded, or worked; whether such work is entirely abandoned, or whether occasionally resumed; if such lode does exist, by whom claimed, under what designation, and in which subdivision of the land it lies; whether any placer mine or mines exist upon the land; if so, what is the character thereof—whether of the shallow-surface description, or of the deep cement, blue lead, or gravel deposits; to what extent mining is carried on when water can be obtained, and what the facilities are for obtaining water for mining purposes; upon what particular ten-acre subdivisions mining has been done, and at what time the land was abandoned for mining purposes, if abandoned at all.

107. The testimony should also show the agricultural capacities of the land—what kind of crops are raised thereon, and the value thereof; the number of acres actually cultivated for crops of cereals or vegetables, and within which particular ten-acre subdivision such crops are raised; also which of these subdivisions embrace the improvements, giving in detail the extent and value of the improvements, such as house, barn, vineyard, orchard, fencing, etc., and mining improvements.

108. The testimony should be as full and complete as possible; and

in addition to the leading points indicated above, where an attempt is made to prove the mineral character of lands which have been entered under the agricultural laws, it should show at what date, if at all, valuable deposits of mineral were first known to exist on the lands.

109. When the case comes before this office such decision will be made as the law and the facts may justify; in cases where a survey is necessary to set apart the mineral from the agricultural land, the proper party *at his own expense* will be required to have the work done, at his option, either by United States deputy, county, or other local surveyor; application therefor must be made to the register and receiver, accompanied by a description of the land to be segregated, and the evidence of service upon the opposite party of notice of his intention to have such segregation made. The register and receiver will forward the same to this office, when the necessary instructions for the survey will be given. The survey in such case, where the claims to be segregated are vein or lode claims, must be executed in such manner as will conform to the requirements in section 2320, United States Revised Statutes, as to length and width and parallel end lines.

110. Such survey when executed must be properly sworn to by the surveyor, either before a notary public, officer of a court of record, or before the register or receiver, the deponent's character and credibility to be properly certified to by the officer administering the oath.

111. Upon the filing of the plat and field notes of such survey with the register and receiver, duly sworn to as aforesaid, they will transmit the same to the surveyor-general for his verification and approval, who, if he finds the work correctly performed, will properly mark out the same upon the original township plat in his office, and furnish authenticated copies of such plat and description both to the proper local land office and to this office, to be affixed to the duplicate and triplicate township plats, respectively.

112. With the copy of plat and description furnished the local office and this office must be a diagram tracing, verified by the surveyor-general, showing the claim or claims segregated, and designating the separate fractional agricultural tracts in each 40-acre legal subdivision by the proper lot number, beginning with No. 1 in each section, and giving the area in each lot, the same as provided in paragraph 45, in the survey of mining claims on surveyed lands.

113. The fact that a certain tract of land is decided upon testimony to be mineral in character is by no means equivalent to an award of the land to a miner. In order to secure a patent for such land he must proceed as in other cases, in accordance with the foregoing regulations.

Blank forms for proofs in mineral cases are not furnished by the General Land Office.

MINING RIGHTS WITHIN THE DISTRICT OF ALASKA TO NATIVE-BORN CITIZENS OF THE DOMINION OF CANADA—SECTION 13, ACT OF MAY 14, 1898.

114. Section 13, act of May 14, 1898, according to native-born citizens of Canada "the same mining rights and privileges" accorded to citizens of the United States in British Columbia and the Northwest Territory by the laws of the Dominion of Canada, is not now and never has been operative, for the reason that the only mining rights and

privileges granted to any person by the laws of the Dominion of Canada are those of leasing mineral lands upon the payment of a stated royalty, and the mining laws of the United States make no provision for such leases.

MINERAL ENTRIES WITHIN FOREST RESERVES.

115. The following is an extract from circular entitled Rules and Regulations Governing Forest Reservations established under section 24 of the act of March 3, 1891 (26 Stat. L., 1095), approved June 30, 1897 (24 L. D., 589-593-594).

LOCATION AND ENTRY OF MINERAL LANDS.

The law provides that "any mineral lands in any forest reservation which have been or which may be shown to be such, and subject to entry under the existing mining laws of the United States and the rules and regulations applying thereto, shall continue to be subject to such location and entry," notwithstanding the reservation. This makes mineral lands in the forest reserves subject to location and entry under the general mining laws in the usual manner.

Owners of valid mining locations made and held in good faith under the mining laws of the United States and the regulations thereunder are authorized and permitted to fell and remove from such mining claims any timber growing thereon, for actual mining purposes in connection with the particular claim from which the timber is felled or removed. (For further use of timber by miners see below, under heading "Free use of timber and stone.")

FREE USE OF TIMBER AND STONE.

The law provides that "the Secretary of the Interior may permit, under regulations to be prescribed by him, the use of timber and stone found upon such reservations, free of charge, by bona fide settlers, miners, residents, and prospectors for minerals, for firewood, fencing, buildings, mining, prospecting, and other domestic purposes, as may be needed by such persons for such purposes; such timber to be used within the State or Territory, respectively, where such reservations may be located."

This provision is limited to persons resident in forest reservations who have not a sufficient supply of timber or stone on their own claims or lands for the purposes enumerated, or for necessary use in developing the mineral or other natural resources of the lands owned or occupied by them. Such persons, therefore, are permitted to take timber and stone from public lands in the forest reservations under the terms of the law above quoted, strictly for their individual use on their own claims or lands owned or occupied by them, but not for sale or disposal, or use on other lands, or by other persons: *Provided*, That where the stumpage value exceeds one hundred dollars, application must be made to and permission given by the Department.

BINGER HERMANN,
Commissioner.

DEPARTMENT OF THE INTERIOR, *June 24, 1899.*

Approved:

E. A. HITCHCOCK, *Secretary.*

CIRCULAR.

RULES AND REGULATIONS GOVERNING THE USE OF TIMBER ON PUBLIC MINERAL LANDS.

DEPARTMENT OF THE INTERIOR,
GENERAL LAND OFFICE,
Washington, D. C., January 18, 1900.

By virtue of the power vested in the Secretary of the Interior by the first section of the act of June 3, 1878, entitled "An act authorizing the citizens of Colorado, Nevada, and the Territories to fell and remove timber on the public domain for mining and domestic purposes," the following rules and regulations are hereby prescribed:

1. The act applies to the States of Colorado, Nevada, Montana, Idaho, Wyoming, North Dakota, South Dakota, and Utah, and the Territories of New Mexico and Arizona, and all other mineral districts of the United States.

2. The land from which timber may be felled or removed under the provisions of this act must be known to be of a *strictly mineral* character and "not subject to entry under existing laws of the United States, except for mineral entry." Parties who take timber from the public lands under assumed authority of this act must stand prepared to show that their acts are within the prescribed terms of the law granting such privilege, the burden being on such parties of proving by a preponderance of evidence that the land from which the timber is taken is "mineral" within the meaning of the act.

3. The privileges granted are confined to citizens of the United States and other persons *bona fide* residents of the States, Territories, and other mineral districts provided for in the act.

4. The uses for which timber may be felled or removed are limited by the wording of the act to "building, agricultural, mining, or other domestic purposes."

5. No timber is permitted to be felled or removed for purposes of sale or traffic, or to manufacture the same into lumber or other timber product as an article of merchandise, or for any other use whatsoever, except as defined in section 4 of these rules and regulations.

6. No timber cut or removed under the provisions of this act may be transported out of the State or Territory where procured.

7. No timber is permitted to be used for smelting purposes, smelting being a separate and distinct industry from that of mining.

8. No growing trees of any kind whatsoever less than eight inches in diameter are permitted to be cut.

9. Persons felling or removing timber under the provisions of this act must utilize all of each tree cut that can be profitably used, and must dispose of the tops, brush, and other refuse in such manner as to prevent the spread of forest fires.

10. These rules and regulations shall take effect February 15, 1900, and all existing rules and regulations heretofore prescribed under said act by this Department are hereby rescinded.

W. A. RICHARDS,
Acting Commissioner.

Approved, January 18, 1900.

E. A. HITCHCOCK, *Secretary.*

DEPARTMENT OF THE INTERIOR,
Washington, June 1, 1900.

The COMMISSIONER OF THE GENERAL LAND OFFICE.

SIR: To conform to the principles announced by the Supreme Court in the case of *Del Monte Mining Co. v. Last Chance Mining Co.* (171 U. S., 55), as applied and followed by this Department in the recent case of *Hustler and New Year lode claims* (29 L. D., 668), paragraph 7

of the mining regulations, approved June 24, 1899 (28 L. D., 577, 595), is hereby amended so as to read as follows:

7. The rights granted to locators under section 2322, Revised Statutes, are restricted to such locations on veins, lodes, or ledges as may be "situated on the public domain." In applications for patent to lode claims where the survey conflicts with the survey or location lines of another lode claim and the ground in such conflict is excluded, the applicant not only has no right to the excluded ground, but he has no right to that portion of any vein or lode the top or apex of which lies within such excluded ground, unless his location was prior to May 10, 1872. His right to the lode claimed terminates where the lode, in its onward course or strike, intersects the exterior boundary of such excluded ground and passes within it.

Paragraph 8 of said mining regulations is hereby abolished.

Very respectfully

E. A. HITCHCOCK, *Secretary.*

COAL-LAND LAW AND REGULATIONS THEREUNDER.

DEPARTMENT OF THE INTERIOR,
GENERAL LAND OFFICE,
Washington, D. C., July 31, 1882.

GENTLEMEN: The following sections of the Revised Statutes provide for the sale of coal lands of the United States:

TITLE XXXII, CHAPTER SIX.

MINERAL LANDS AND MINING RESOURCES.

Entry of coal lands. 3 March, 1873, c. 279, s. 1, v. 17, p. 607. SEC. 2347. Every person above the age of twenty-one years, who is a citizen of the United States, or who has declared his intention to become such, or any association of persons severally qualified as above, shall, upon application to the register of the proper land office, have the right to enter, by legal subdivisions, any quantity of vacant coal-lands of the United States not otherwise appropriated or reserved by competent authority, not exceeding one hundred and sixty acres to such individual person, or three hundred and twenty acres to such association, upon payment to the receiver of not less than ten dollars per acre for such lands, where the same shall be situated more than fifteen miles from any completed railroad, and not less than twenty dollars per acre for such lands as shall be within fifteen miles of such road.

Pre-emption of coal lands. *Ibid.*, s. 2. SEC. 2348. Any person or association of persons severally qualified, as above provided, who have opened and improved, or shall hereafter open and improve, any coal mine or mines upon the public lands, and shall be in actual possession of the same, shall be entitled to a preference-right of entry, under the preceding section, of the mines so opened and improved: *Provided*, That when any association of not less than four persons, severally qualified as above provided, shall have expended not less than five thousand dollars in working and improving any such mine or mines, such association may enter not exceeding six hundred and forty acres, including such mining improvements.

Pre-emption claims of coal land to be presented within sixty days, &c. *Ibid.*, s. 3. SEC. 2349. All claims under the preceding section must be presented to the register of the proper land-district within sixty days after the date of actual possession and the commencement of improvements on the land, by the filing of a declaratory statement therefor; but when the township plat is not on file at the date of such improvement, filing must be made within sixty days from the receipt of such plat at the district office; and where the improvements shall have been made prior to the expiration of three months from the third day of March, eighteen hundred and seventy-three, sixty days from the expiration of such three months shall be allowed for the filing of a declaratory statement, and no sale under the provisions of this section shall be allowed until the expiration of six months from the third day of March, eighteen hundred and seventy-three.

SEC. 2350. The three preceding sections shall be held to authorize only one entry by the same person or association of persons; and no association of persons any member of which shall have taken the benefit of such sections, either as an individual or as a member of any other association, shall enter or hold any other lands under the provisions thereof; and no member of any association which shall have taken the benefit of such sections shall enter or hold any other lands under their provisions; and all persons claiming under section twenty-three hundred and forty-eight shall be required to prove their respective rights and pay for the lands filed upon within one year from the time prescribed for filing their respective claims; and upon failure to file the proper notice, or to pay for the land within the required period, the same shall be subject to entry by any other qualified applicant.

Only one entry allowed. *Ibid.*, s. 4.

SEC. 2351. In case of conflicting claims upon coal lands where the improvements shall be commenced, after the third day of March, eighteen hundred and seventy-three, priority of possession and improvement, followed by proper filing and continued good faith, shall determine the preference right to purchase. And also where improvements have already been made prior to the third day of March, eighteen hundred and seventy-three, division of the land claimed may be made by legal subdivisions, to include, as near as may be, the valuable improvements of the respective parties. The Commissioner of the General Land Office is authorized to issue all needful rules and regulations for carrying into effect the provisions of this and the four preceding sections.

Conflicting claim. *Ibid.*, s. 5.

SEC. 2352. Nothing in the five preceding sections shall be construed to destroy or impair any rights which may have attached prior to the third day of March, eighteen hundred and seventy-three, or to authorize the sale of lands valuable for mines of gold, silver, or copper.

Rights reserved. *Ibid.*, s. 6.

AN ACT To extend the coal land laws to the district of Alaska.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That so much of the public land laws of the United States are hereby extended to the district of Alaska as relate to coal lands, namely, sections twenty-three hundred and forty-seven to twenty-three hundred and fifty-two, inclusive, of the Revised Statutes.

Approved, June 6, 1900.

RULES AND REGULATIONS.

Under the authority conferred by said section 2351 the following rules and regulations are issued for carrying into effect the provisions of said law:

1. Sale of coal lands is provided for—

By ordinary *private entry* under section 2347.

By granting a *preference right* of purchase, based on priority of possession and improvement, under section 2348.

2. The land entered under either section must be *by legal subdivisions*, as made by the regular United States survey. Entry is confined to surveyed lands; to such as are vacant, not otherwise appropriated, reserved by competent authority, or containing valuable minerals other than coal.

3. Individuals and associations may purchase. If an individual, he must be twenty-one years of age and a citizen of the United States, or have declared his intention to become such citizen.

4. If an association of persons, each person must be qualified as above.
5. A person is not disqualified by the ownership of any quantity of other land, nor by having removed from his own land in the same State or Territory.
6. Any individual may enter by legal subdivisions as aforesaid any area not exceeding one hundred and sixty acres.
7. Any association may enter not to exceed three hundred and twenty acres.
8. Any association of not less than four persons, duly qualified, who shall have expended not less than \$5,000 in working and improving any coal mine or mines, may enter under section 2348 not exceeding six hundred and forty acres, including such mining improvements.
9. One person can have the benefit of one entry or filing *only*. He is disqualified by having made such entry or filing alone or as a member of an association. No entry can be allowed an association which has in it a single person thus disqualified, as the law prohibits the entry or holding of more than one claim either by an individual or an association.
10. Lands that are sufficiently valuable for gold, silver, or copper to prevent their entry as agricultural lands can not be entered as coal lands; and you will not allow any entry to be made under the above-named provisions of law of lands valuable for their deposits of said minerals.
11. The present rules relative to "hearings to establish the character of lands," contained in General Land Office regulations of October 31, 1881, issued under the mining laws, will, as far as applicable, govern your action in determining the character of lands sought to be entered as coal land.
12. The price per acre is \$10 where the land is situated *more* than fifteen miles from any completed railroad, and \$20 per acre where the land is *within* fifteen miles of such road. The price of the land, however, must be determined by its distance from a completed railroad at the date of payment and entry irrespective of the preference right of entry.
13. When application is made to purchase coal land at the rate of \$10 per acre you will in all cases require satisfactory proof that the land applied for is, at the date of entry, situated more than fifteen miles from any completed railroad. This proof may consist of the affidavit of the applicant, or that of his duly authorized agent, corroborated by the affidavit of some disinterested credible party showing personal knowledge of the facts.
14. Where the land lies *partly within* fifteen miles of such road and in *part outside* such limit, the *maximum* price must be paid for all legal subdivisions the greater part of which lie within fifteen miles of such road.
15. The term "completed railroad" is held to mean one which is actually constructed on the face of the earth; and lands within fifteen miles of any point of a railroad so constructed will be held and disposed of at \$20 per acre.
16. Any duly qualified person or association must be preferred as purchasers of those public lands on which they have opened and improved, or shall open and improve, any coal mine or mines, and which they shall have in actual possession.
17. Possession by agent is recognized as the possession of the prin-

cipal. The clearest proof on the point of agency must, however, be required in every case, and a clearly defined possession must be established.

18. The *opening and improving* of a coal mine, in order to confer a preference right of purchase, must not be considered as a mere matter of form; the labor expended and improvements made must be such as to clearly indicate the good faith of the claimant.

19. These lands are intended to be sold, where there are adverse claimants therefor, to the party who, by substantial improvements, actual possession, and a reasonable industry, shows an intention to continue his development of the mines in preference to those who would purchase for speculative purposes only. With this view, you will require such proof of compliance with the law, when lands are applied for under section 2348 by adverse claimants, as the circumstances of each case may justify.

20. In conflicts where improvements have been or shall hereafter be commenced, priority of possession and improvement shall govern the award when the law has been fully complied with by each party. A mere possession, however, without satisfactory improvements, will not secure the tract to the first occupant when a subsequent claimant shows his full compliance with the law.

21. After an entry has been allowed to one party you will make no investigation concerning it at the instance of any person except on instructions from this office. You will, however, receive all affidavits concerning such case and forward the same to this office, accompanied by a statement of the facts as shown by your records.

22. Prior to entry it is competent for you to order an investigation, on sufficient grounds set forth under oath of a party in interest and substantiated by the affidavits of disinterested and credible witnesses.

MANNER OF OBTAINING TITLE.

23. When title is sought by *private entry* the party will himself make oath to the following application, which must be presented to the register:

I, _____, hereby apply, under the provisions of the Revised Statutes of the United States relating to the sale of coal lands of the United States, to purchase the _____ quarter of section _____, in township _____, of range _____, in the district of lands subject to sale at the land office at _____, and containing _____ acres, and I solemnly swear that no portion of said tract is in the possession of any other party; that I am twenty-one years of age, a citizen of the United States (or have declared my intention to become a citizen of the United States), and have never held nor purchased lands under said act, either as an individual or as a member of an association; and I do further swear that I am well acquainted with the character of said-described land, and with each and every legal subdivision thereof, having frequently passed over the same; that my knowledge of said land is such as to enable me to testify understandingly with regard thereto; that said land contains large deposits of coal, and is chiefly valuable therefor; that there is not to my knowledge within the limits thereof any vein or lode of quartz or other rock in place bearing gold, silver, or copper, and that there is not within the limits of said land, to my knowledge, any valuable deposit of gold, silver, or copper. So help me God.

24. Thereupon the register, if the tract is vacant, will so certify to the receiver, stating the price, and the applicant or his duly authorized agent must then pay the amount of purchase money.

25. The receiver will then issue to the purchaser a duplicate receipt, and at the close of the month the register and receiver will make returns of the sale to the General Land Office, from whence, when the proceedings are found regular, a patent or complete title will be issued; and on surrender of the duplicate receipt such patent will be delivered, at the option of the patentee, either by the Commissioner at Washington or by the register at the district land office.

26. This disposition at private entry will be subject to any valid prior adverse right which may have attached to the same land and which is protected by section 2348.

27. *Second.* When the application to purchase is based on a priority of possession, &c., as provided for in section 2348, the claimant must, when the township plat is on file in your office, file his declaratory statement for the tract claimed sixty days from and after the first day of his actual possession and improvement. Sixty days, exclusive of the first day of possession, &c., must be allowed.

28. The declaratory statement must be substantially as follows, to wit:

I, ———, do solemnly swear that I am ——— years of age, and a citizen of the United States (or have declared my intention to become a citizen of the United States), that I never have, either as an individual or as a member of an association, held or purchased any coal lands under the provisions of the Revised Statutes of the United States relating to the sale of coal lands of the United States, and I do hereby declare my intention to purchase, under the provisions aforesaid, the ——— quarter of section ———, in township ———, of range ———, of lands subject to sale at the district land office at ———, and that I came into possession of said tract on the ——— day of ———, A. D., 18—, and have ever since remained in actual possession continuously; that I have located and opened a valuable mine of coal thereon, and have expended in labor and improvements on said mine the sum of ——— dollars, the labor and improvements being as follows: [here describe the nature and character of the improvements]; and I do furthermore solemnly swear that I am well acquainted with the character of said-described land, and with each and every legal subdivision thereof, having frequently passed over the same; that my knowledge of said land is such as to enable me to testify understandingly with regard thereto; that there is not, to my knowledge, within the limits thereof, any vein or lode of quartz or other rock in place bearing gold, silver, or copper, and that there is not within the limits of said land, to my knowledge, any valuable deposit of gold, silver, or copper. So help me God.

29. When the township plat is not on file at date of claimant's first possession the declaratory statement must be filed within sixty days from the filing of such plat in your office.

30. One year from and after the expiration of the period allowed for filing the declaratory statement is given within which to make proof and payment; but you will allow no party to make final proof and payment except on notice to all others who appear on your records as claimants to the same tract.

31. A party who otherwise complies with the law may enter *after* the expiration of said year, *provided* no valid adverse right shall have intervened. He postpones his entry beyond said year at his own risk, and the Government can not thereafter protect him against another who complies with the law, and the value of his improvements can have no weight in his favor.

32. Each claimant at the time of actual purchase must make affidavit as follows:

I, ———, claiming under the provisions of the Revised Statutes of the United States relating to the sale of coal lands of the United States, the right of purchase to

the ——— quarter of section ———, in township ———, of range ———, subject to sale at ———, do solemnly swear that I have never had the right of purchase under the aforesaid provisions of law either as an individual or as a member of an association, and that I have never held any other lands under its provisions; I further swear that I have expended in developing coal mines on said tract in labor and improvements the sum of ——— dollars, the nature of such improvements being as follows: ———; that I am now in the actual possession of said mines, and make the entry for my own use and benefit, and not directly or indirectly for the use and benefit of any other party; and I do furthermore swear that I am well acquainted with the character of said described land, and with each and every legal subdivision thereof, having frequently passed over the same; that my knowledge of said land is such as to enable me to testify understandingly with regard thereto; that the same is chiefly valuable for coal; that there is not, to my knowledge, within the limits thereof any vein or lode of quartz or other rock in place bearing gold, silver, or copper, and that there is not within the limits of said land, to my knowledge, any valuable deposit of gold, silver, or copper. So help me God.

33. The application, declaratory statement, and the affidavit required at the time of actual purchase, the forms of which are given above under paragraphs 23, 28, and 32, may be sworn to before any officer authorized by law to administer oaths, but the authority of such officer must be properly shown.

34. Any party duly qualified under the law, *after* swearing to his application or declaratory statement, may, by a sufficient power of attorney duly executed under the laws of the State or Territory in which such party may then be residing, empower an agent to file with the register of the proper land office the application, declaratory statement, or affidavit required at the time of actual purchase, and also authorize him to make payment for and entry of the land in the name of such qualified party; and when such power of attorney shall have been filed in your office you will permit such agent to act thereunder as above indicated.

35. Where a claimant shows by affidavit that he is not personally acquainted with the character of the land, his duly authorized agent who possesses such knowledge may make the required affidavit as to its character; but whether this affidavit is made by principal or agent it must be corroborated by the affidavits of two disinterested and credible witnesses having knowledge of its character.

36. Nothing in these regulations shall be so construed as to prevent a party from proving his citizenship or age, or establishing the status of the lands sought to be entered, in accordance with ordinary rules of evidence; and any proof regularly introduced for that purpose that would be competent in a court or before a commissioner charged with the ascertainment of facts may be considered.

37. Assignments of the right to purchase will be recognized when properly executed. Proof and payment must be made, however, within the prescribed period, which dates from the first day of the possession of the assignor who initiated the claim.

38. The "Rules of Practice in cases before the United States district land offices, the General Land Office, and the Department of the Interior," approved December 20, 1880, will, as far as applicable, govern all cases and proceedings arising under the sections of the Revised Statutes above quoted providing for the sale of coal lands of the United States.

39. You will report at the close of each month as "sales of coal lands" all filings and entries in separate abstracts, commencing with

number *one*, and thereafter proceeding consecutively in the order of their reception. Where a series of numbers has already been commenced by sale of coal lands you will continue the same without change.

N. C. McFARLAND,
Commissioner.

TO REGISTERS AND RECEIVERS.

DEPARTMENT OF THE INTERIOR, *July 31, 1882.*

Approved.

H. M. TELLER,
Secretary.

INTERIOR DEPARTMENT,
GENERAL LAND OFFICE,
Washington, D. C., December 28, 1897.

This circular is reissued for the information and benefit of those concerned.

BINGER HERMANN,
Commissioner.

PART II.

PRODUCTION OF GOLD AND SILVER IN FOREIGN COUNTRIES.

PRODUCTION OF GOLD AND SILVER IN FOREIGN COUNTRIES.

AFRICA.

In 1899 Africa produced gold to the value of \$73,227,108, which was a slight falling off from the high-water mark reached the previous year, when it furnished \$80,128,485, or nearly 28 per cent of the world's product. This was the direct result of the war in the Transvaal. Compared, however, with the product of the year before last, the year 1899 was still unusually successful, showing an advance of \$14,668,426, or 25 per cent over 1897.

The following table shows whence the output has been derived since 1889:

Years.	Transvaal.		West Coast.		French colonies. <i>a</i>		Rhodesia. <i>b</i>		Total.	
	Weight.	Value.	Weight.	Value.	Weight.	Value.	Weight.	Value.	Weight.	Value.
	<i>Kilos.</i>		<i>Kilos.</i>		<i>Kilos.</i>		<i>Kilos.</i>		<i>Kilos.</i>	
1889	11,719	\$7,788,372	1,270	\$844,262	261	\$173,461	(<i>c</i>)	.....	13,250	\$8,806,095
1890	15,706	10,438,356	1,062	705,705	261	173,461	(<i>c</i>)	.....	17,029	11,317,522
1891	22,398	14,885,639	1,289	856,730	261	173,461	(<i>c</i>)	.....	23,948	15,915,830
1892	34,938	23,220,108	1,528	1,011,924	<i>d</i> 261	173,461	(<i>c</i>)	.....	36,722	24,405,493
1893	42,573	28,293,831	977	649,695	261	173,461	(<i>c</i>)	.....	43,811	29,116,987
1894	59,730	39,696,330	865	574,653	261	173,461	(<i>c</i>)	.....	60,856	40,444,444
1895	66,045	43,893,300	995	661,630	261	173,461	(<i>c</i>)	.....	67,301	44,728,391
1896	65,874	43,779,669	945	627,938	261	173,461	(<i>c</i>)	.....	67,080	44,581,068
1897	86,720	57,633,861	751	499,311	640	425,510	(<i>c</i>)	.....	88,111	58,558,682
1898	119,190	79,213,953	518	343,928	189	125,987	669	\$444,617	120,566	80,128,485
1899	107,871	71,691,163	422	280,185	<i>e</i> 189	125,987	1,700	1,129,773	110,182	73,227,108

a Includes Madagascar, Algeria, and the French Soudan.
b Includes Mozambique, Cape Colony, and Zululand.
c Previous to 1898 Rhodesia and Mozambique together produced 289 kilograms, fine included in the Transvaal returns.
d Previous to 1897 the only figures obtainable were those for 1892, Madagascar only.
e Product for 1898.

As seen from this table, the bulk of the African gold product came from the Transvaal, which, in 1898 and 1899, yielded about 98 per cent of the total for Africa.

THE TRANSVAAL.

According to the tenth annual report of the Chamber of Mines of the South African Republic, the total production of the Transvaal in 1898 was divided as follows:

Districts.	Quantity.		Value.	
			Commercial.	Coining.
Witwatersrand.....	<i>Crude ounces.</i> 4,295,609	<i>Fine ounces.</i> 3,614,385	\$73,685,506	\$74,715,969
All others.....	259,413	217,590	4,393,277	4,497,984
Total.....	4,555,022	3,831,975	78,078,783	79,213,953

The outbreak of the war between the Transvaal and Great Britain resulted in a suspension of operations in most of the mines of the Rand district, by far the most important in the Transvaal. Complete information could, therefore, be obtained from Witwatersrand only for the first nine months of 1899; no information was available for any of the other districts.

The weight of the total gold product of the nine months, from January to September, 1899, is given by The Mining World of January 6, 1900, at 3,913,810 ounces, crude. The value of the product for the same period is given by L'Économiste Européen of August 3, 1900, at 356,156,000 francs, which is equivalent to \$68,738,108. This represents an average value of \$17.56 per ounce, crude, which would fix the average fineness at 0.8496.

The product of the last three months of the year is given by L'Économiste Européen as 168,181 ounces, crude, making a total production for the year of 4,081,991 ounces, crude. Calculating the fine product at the rate of 0.8496, obtained above, it would make 3,468,060 ounces, or 107,871 kilograms, fine, valued at \$71,691,163.

The following table shows the annual production of the Witwatersrand, by months, since 1894 :

Months.	1894.	1895.	1896.	1897.	1898.	1899.
	<i>Ounces.</i>	<i>Ounces.</i>	<i>Ounces.</i>	<i>Ounces.</i>	<i>Ounces.</i>	<i>Ounces.</i>
January.....	149,814	177,463	148,178	209,832	313,827	410,145
February.....	151,870	169,395	167,018	211,000	297,976	404,335
March.....	165,372	184,945	173,952	232,066	325,908	441,578
April.....	168,745	186,323	176,707	235,698	335,125	439,111
May.....	169,773	194,580	195,008	248,305	344,160	444,933
June.....	168,162	200,941	193,640	251,529	344,671	445,763
July.....	167,953	199,453	203,873	242,479	359,344	456,474
August.....	174,977	203,573	213,418	259,603	376,912	459,709
September.....	176,707	194,764	202,561	262,150	384,080	411,762
October.....	173,378	192,652	199,889	274,175	400,791	32,731
November.....	175,304	195,218	201,113	297,124	393,311	61,780
December.....	182,104	178,428	206,517	310,712	419,504	73,670
Total.....	2,024,159	2,277,635	2,281,874	3,034,673	4,295,609	4,081,991

It is seen from this table that, but for the war, the output of 1899 was bidding fair to outrun that of 1898, the largest in the history of the Rand mines, the yield from January to September (both inclusive), 1899—3,913,810 ounces—showing an increase of 831,813 ounces over that for the same months in 1898—3,081,997 ounces.

Since the beginning of gold mining on the Rand, the total production of gold has amounted to 22,551,210 ounces.

The following table shows the annual output of the mines from the opening till the end of 1899:

GOLD PRODUCTION OF THE WITWATERSRAND.

Years.	Quantity.	Year.	Quantity.
	<i>Ounces.</i>		<i>Ounces.</i>
1887.....	23,125	1894.....	2,024,164
1888.....	208,122	1895.....	2,277,640
1889.....	369,557	1896.....	2,280,892
Estimated unrecorded production,		1897.....	3,034,679
1887, 1888, 1889.....	42,000	1898.....	4,295,609
1890.....	494,817	1899.....	4,081,991
1891.....	729,268		
1892.....	1,210,869	Total.....	22,551,210
1893.....	1,478,477		

RAND MINES DURING THE WAR.

J. Klimke, ex-state mining engineer of the Transvaal, is in London from South Africa, and to the *African Review* makes interesting statement with reference to mining operations carried on by the Transvaal government during the war. The Transvaal government, disapproving of his direction of mining affairs on the Rand, offered him leave of absence for an indefinite period. He thereupon resigned.

The first mines to be taken over by the Transvaal government were the Robinson, Bonanza, Ferreira Deep, and Rose Deep. Government mining inspectors were put in as managers, and reported that they had great difficulties in starting the mines. They found that a great many repairs were necessary, and, as nearly all the mining men had left the country, it was not easy to carry out these repairs. As soon as they were done, however, the managers revised and brought up to date the plans of each mine. In one or two cases work had been done in the mines which was not shown in the plans, and in these cases the drawings were amended. Regular surveys of the mines were carried out and the results recorded on the plans, which constitute an accurate record of the work done in the mines by the Boers from October 10 to the end of May, the period of their operation. These four government mines were worked entirely in the interests of the government, and in order to profit to the fullest extent it worked the richest stopes, did no development work whatever, and reduced the Kaffir wages to an average of £1 per month, for the government did not want more natives on the Rand than were absolutely necessary. In order to make the Kaffir rate of pay uniform, a notice was inserted in the *Staats Courant* enacting that every manager who paid more than £1 per month would be fined £10 for each offense, and it also forbade a manager to receive into his compound natives from another mine under pain of a similar penalty.

Thus the government was able to work the mines at much lower working costs than had hitherto been possible. In course of time six other mines—the Ferreira, the Village Main Reef, the Wemmer, the Worcester, the Geldenhuis Estate, and the Langlaate Deep—were started working under the control of the companies' own managers. If these mines were not worked in the interests of the shareholders it was the managers' own fault. The government did not interfere in any way with their working of the mines. It only stipulated that all the gold produced should be handed over to the State treasury, and in return it promised to pay all the costs of working. It did not keep this promise, however, and has left the ten mines worked in its interests with liabilities amounting in the aggregate to over a quarter of a million sterling. However, the damage to the mines has been confined to the ore actually extracted, apart from the consideration that no development work was done, and the government mines, as they are called, are in this position to-day, that they can resume work at any time. As regards the mines not worked in the interests of the government, no damage has been done to them as far as one could see. There will certainly be some repairs necessary—this is always unavoidable when a mine has been closed down for any length of time—but no damage has been done other than is natural.

With regard to the gold production, Mr. Klimke furnished the following figures, which are claimed to comprise the only complete

and authentic return of the results of the Transvaal government's mining operations yet published. The appended table covers the period from the beginning of the war (October 10) to April 30 last:

Mines.	Ounces (fine) according to mine assays.	Value according to statements of managers.			Approximate amounts of unpaid work- ing costs.
		£	s.	d.	
Robinson.....	102,926.00	428,069	0	0	£ 47,073
Bonanza.....	52,929.33	213,329	0	0	14,271
Rose Deep.....	44,310.06	155,350	12	3	60,322
Ferreira Deep.....	54,213.10	227,695	0	0	30,019
Ferreira.....	58,511.75	211,690	3	11	43,488
Village Main Reef.....	48,120.50	203,992	13	5	25,286
Wemmer.....	37,274.87	157,965	6	0	11,767
Worcester.....	10,096.00	38,635	0	0	17,518
Geldenhuis Estate.....	9,960.30	34,898	10	5	8,125
Langlaate Deep.....	10,919.00	38,924	0	0	10,927
Total.....	428,270.89	1,710,549	6	0	265,761

To these totals the figures for May, the concluding month of Boer operations, must be added. Mr. Klimke estimates the May output of the ten mines worked at about 60,000 ounces, of the value of £240,000.

There is also to be added the output of the Crown Reef, which was crushing the ore from the dumps until the end of March, and the gold obtained from the plates, mortars, etc., of the nonworking mines, which were cleaned by the government. "The exact amount of gold thus obtained," says Mr. Klimke, "will probably never be ascertained."

Making only a moderate allowance for these items, it will be seen that gold to the value of £2,000,000 has been extracted by the Transvaal government from the mines of the Witwatersrandt. It has paid in working costs, Mr. Klimke estimates, about £500,000, and thus has made a profit on its mining operations of about £1,500,000.

It will take at least one year after the conclusion of the war to bring the mines into full swing again—that is to say, to return to the average production of the working nine months of last year.

(From The Mining and Scientific Press, San Francisco, September 1, 1900.)

WEST COAST OF AFRICA.

The product of the west coast of Africa is assumed to equal the amount of its bullion exports to Great Britain during the year.

GOLD IMPORTED INTO ENGLAND FROM THE WEST COAST OF AFRICA SINCE 1889.

Years.	Weight.		Value.	Weight, fine.
	Standard (916 $\frac{2}{3}$).	Fine.		
	Ounces.	Ounces.		Kilograms.
1889.....	44,554	40,841.17	\$844,262	1,270
1890.....	37,242	34,138.50	705,705	1,062
1891.....	45,212	41,444.33	856,730	1,289
1892.....	53,402	48,951.83	1,011,924	1,523
1893.....	34,286	31,429.00	649,695	977
1894.....	30,326	27,798.83	574,653	865
1895.....	34,916	32,006.33	661,630	995
1896.....	33,138	30,376.50	627,938	945
1897.....	26,350	24,154.17	499,311	751
1898.....	18,150	16,637.50	343,928	518
1899.....	14,786	13,553.93	280,185	422

MINING AND RAILWAYS ON THE GOLD COAST.

[Consular Report No. 233, February, 1900. Page 267.]

According to a British colonial report, the mining industry on the Gold Coast is largely on the increase, and, although the year 1898 was employed chiefly in the development of the mines, some work resulting in immediate profit has been done. Several companies have been started with the intention of commencing mining operations, and the promoters are not only experienced men with scientific knowledge, but are also possessed of the necessary capital to undertake the work with success. The report continues:

The gold industry of this colony is likely to prove one of its most solid and valuable assets. Experts who have gained experience in the Transvaal gold fields assert that the banket reefs in this colony are not only similar to but of higher grade than those in the Transvaal. In the western province of this colony it is estimated that there are about 20 miles of banket formation, and if this land were treated in the same way as similar land is in Johannesburg, it is thought it would contain 13,000,000 tons of banket reef, from which about £40,000,000 (\$194,660,000) worth of gold could be extracted by 'ten years' operations with 1,350 stamps and the cyanide process, yielding an annual profit of fully £1,250,000 (\$6,083,125). This would necessitate an initial investment of £2,000,000 (\$9,733,000), and the area of land would allow forty companies to work, each returning a profit of £3,000 (\$14,600) a month, provided the necessary capital was put in.

It will be impossible for any of the mines to be worked at the profit above mentioned until the railway in course of construction is completed, and this is felt by most of the companies, who are simply waiting for the completion of the railway to commence operations on a large scale. At present the cost of transport ranges from £18 to £50 (\$87 to \$243) per ton, and the impossibility of getting suitable stamps and other machinery prevents the proper working of the mines. This serious obstacle would disappear with the opening of the railway.

Notwithstanding the great difficulties which have to be contended with at the present time, in consequence of the inadequacy of the machinery, it will be of interest to know that one mine in the Wassaw district had an output in 1897 of 6,880 ounces 14 pennyweights, which realized £27,757 (\$135,078); and in 1898, the same company had an output of 4,433 ounces, realizing £17,588 (\$85,591). Another company in the same district had an output in 1898 of 4,368 ounces, realizing £16,480 (\$80,190).

GOLD IN SENEGAL.

The British consul at Dakar reports that since the year 1893 there has been a steady increase in the amount of gold exported from Senegal, which in 1898 reached 128,866 grams, valued at £15,464, as compared with 85,044 grams, valued at £10,205, in 1897. It is considered, too, that a large quantity is not accounted for, as it can so easily be smuggled out, which makes it impossible for the customs authorities to keep an accurate check on the quantity exported. A good deal of gold is also used locally by the natives in the manufacture of articles of jewelry, generally of a heavy nature. A number of concessions of land have been granted to various companies and private individuals, and a good deal of prospecting has been done, but it may be affirmed that so far all the gold which has been exported has been purely the result of native enterprise. (Foreign Office, Annual Series, 2372.)

FRENCH COLONIES IN AFRICA.

MADAGASCAR.

Ambassador Porter states, in answer to inquiries from this Bureau, the gold product of Madagascar for 1898 to have been 98 kilograms fine, or 3,165 ounces, valued at 339,000 francs, or \$65,427.

No information for 1899 being available, the figures for 1898 are preserved.

SOUDAN.

The export of gold from French Soudan to France in 1898 is valued by the *Statistique de l'Industrie Minérale* at 289,000 francs, equal to \$55,777, which corresponds to 2,698 ounces, or 84 kilograms fine.

ALGERIA.

Upon information obtained by Ambassador Porter from the French Government, France imported from Algeria, in 1898, 751 kilograms of gold ore, valued at 24,783 francs, equal to \$4,783, which corresponds to 231 ounces, or 7 kilograms fine.

The product of silver is reported from the same source for 1898 at 213 kilograms, or 6,846 ounces fine, of the commercial value of 21,000 francs, or \$4,053, representing \$8,852 in coining value.

The total gold product of Madagascar, the Soudan, and Algeria for 1898 would accordingly aggregate 189 kilograms, or 6,094 ounces fine, of the commercial value of \$125,987.

BRITISH COLONIES IN AFRICA.

RHODESIA.

Rhodesia reports the gold product for 1899 at 65,303 ounces crude, averaging about \$17.28 per ounce, and making in all about \$1,128,444, which corresponds to 1,698 kilograms, or 54,589 ounces fine.

CAPE COLONY.

According to information received from the United States consul at Cape Town, last year Cape Colony had one gold mine which produced, in 1898, 104 kilograms fine, valued at \$69,118. The product of 1899 is given by the United States consul as 2 kilograms fine, or 64 ounces, valued at \$1,329, which would indicate that mining operations had been practically suspended.

The total gold product of the British colonies in Africa for 1899 thus amounted to 1,700 kilograms, or 54,653 ounces fine, of the value of \$1,129,773.

EGYPT.

The following article by Prof. A. H. Sayce in *The Mining World and Engineering Record* (London) of July 21, 1900, throws some light on the future possibilities of gold mining in that country:

The eastern desert between the Nile and the Red Sea supplied ancient Egypt not only with stone, but also with vast quantities of gold. For several centuries Egypt was the California of the ancient civilized world of the East. The gold so largely used in western Asia was derived from it, while at home the Pharaohs had at their disposal enormous stores of the precious metal. The foreign correspondence discovered a few years ago at Tel-el-Amarna gives us some idea of what the annual output of gold must have been in the century before the Israelitish exodus. The letters received by the Pharaoh from his royal correspondents in Asia are filled with requests for gold, which is described time after time as being as plentiful in this country "as the dust." If the King of Babylonia wants gold for a new temple he is building, it is to Egypt that he turns for it; if the King of Assyria corresponds with the Egyptian court, it is to remind the Pharaoh that not only his father, but even the King of distant Cappadocia, had each received 20 talents of gold from the bounty of the Egyptian

monarch, and that at least as much should be sent to himself. Egypt, it would seem, possessed sufficient gold to supply the whole world. Two centuries later, when Egypt had lost her empire and been overrun and devastated by barbarians from the north, the amount of gold yielded by the desert mines were still enormous. The great Harris papyrus contains an account of the offerings and endowments lavished on the Egyptian temples by Rameses III, of the twentieth dynasty, and the royal revenue it implies is simply amazing. At a later date, under the Ptolemies, the gold obtained from the mines must still have been very considerable. The annual revenue of the second Ptolemy amounted to 14,800 talents or more than 4,000,000 sterling, a large part of which was derived from the gold mines, and, according to Strabo, even under Ptolemy Anletes, in the closing days of monarchy, when Egypt was in a state of financial and political decay, the royal income was still as much as 12,500 talents, or between 3,000,000 and 4,000,000 sterling. These high figures enable us to understand the statement in I Kings, ix, 28, that the Red Sea fleet of Solomon brought back in a single voyage from the emporium of Ophir 450 talents of gold, which, according to one calculation, would be equivalent to £3,240,000. The gold mines of the Egyptian desert must have been worked from a very early period. In a "prehistoric" grave excavated by Mr. Quibell at El-Kab, at the end of the road which led from the Red Sea to the Nile, a gold nugget was found buried with the corpse. On some of the old Egyptian tombs there are representations of the manufacture of gold ornaments, and the jewelry of the twelfth dynasty (cir. B. C. 2500) discovered at Dahshur, and now in the Cairo Museum, is unsurpassed for the beauty and richness of its workmanship. A high official who lived at the time tells us in his biography that he had escorted the gold procured from the mines between Keneh and Kosseir to Coptos. Fresh mines were constantly being opened in the eastern desert. Under the nineteenth dynasty, for instance, we heard for the first time of the mines in the Wadi Abbas, near Redisiya, and the mines of Akita, now the Wadi Allagi, were worked during the same period. Papyrus at Turin contains a map of the mines of Akita and marks the position, not only of the mines themselves, but also of the miners' houses, the well that supplied them with water, and the roads that led to the shafts. It would seem that the mines of Akita were first exploited by Seti I, who constructed a road to them from a point on the Nile opposite the modern Dakka. He also sunk a well in the desert in the hope of finding water, but after boring through the rock to a depth of 120 cubits, or about 190 feet, he abandoned the task. It was, however, resumed by his son, Rameses II, who, after boring 12 feet deeper, succeeded in finding an abundant and perennial spring.

The mines in the Wadi Allagi continued to be worked under the Ptolemies, and a Greek writer, Agatharchides, who lived about B. C. 150, has left us a description of the way in which the quartz was crushed and the gold extracted from it. The process was somewhat rough, and it is not surprising, therefore, that a good deal of the gold obtained by means of it was anything but pure. Indeed, the inscriptions distinguish between gold ore, "gold of the balance" or marketable gold, "best gold," "gold of the second quality," and "white gold." White gold was really electrum, of which considerable use was made. Besides gold, the Egyptians also mined for lead and silver. According to Diodorus, the inscriptions on the walls of the palace of Osymandyas, or Rameses II, at Thebes, stated that the silver mines alone produced the prodigious amount of 3,200 myriads of minæ in the age of the nineteenth dynasty (B. C. 1300); but "white gold" or electrum had probably been confounded by the Greek writer with silver, and in any case the amount must be exaggerated. It is clear, however, from the ancient evidence which we have been passing in review, that the eastern desert of Egypt is peculiarly rich in gold. Immense quantities of the precious metal have been taken from it in the past, and there is every reason to believe that equally large quantities are still to be found there. The mining methods of the old Egyptians were defective as compared with those of to-day, and it was only when the Egyptian Government was strong that the mining operations could be carried on at all. Whenever Egypt fell into a state of feebleness and decay, or was overrun by a foreign enemy, the Bedouin at once became masters of the desert, the mining settlements were destroyed, and the roads to them rendered impassable.

The wells sunk by the Pharaohs were filled up, and the traveler or miner had to depend on such rain water as he could find in the hollows of the rocks. That a good supply of water can be obtained by boring, is, however, certain from the account which has been preserved to us of the well sunk by Rameses II, and it is equally certain that the ancient mines were deserted, not because the supply of gold was in any way exhausted, but because there was no longer a police to protect the miners and the roads along which the gold was carried to the Nile.

ARGENTINA.

No official information from the United States minister at Buenos Ayres has reached this Bureau for 1899.

United States Minister Buchanan wrote under date of April 25, 1899, that there were no statistics for 1898 available as to the product of either gold or silver in Argentina, but that neither would be above \$10,000. No report on the mines of the country is issued.

About \$10,000 worth of silver ore was exported in 1898, and as Argentina does not coin either gold or silver, and does not refine silver ore, this is supposed to represent the full value of the silver mined.

In 1897 the gold product of the country was placed at \$137,694, and it was expected to be increased in 1898 by the opening of new mines.

The cause of the decrease, as stated by Minister Buchanan, is not explained.

In 1897 the silver product was placed at near half a million dollars (coining value), but a heavy decrease in 1898 was anticipated, important mines having closed down.

The chairman of the Argentine Concessions, Limited, reported to a stockholders' meeting, held in London last March, that the company had extracted 1,120 ounces of gold during the first nine months of 1898, and had obtained 607 more from October, 1898, to March, 1899. The product from this one mine for 1898 is therefore about 1,420 ounces, or about 44 kilograms, valued at \$29,252, nearly three times the total product of the country as estimated by Mr. Buchanan.

The table given below was compiled in this Bureau from the statistical bulletin on foreign commerce, issued by the Government of Argentina (*Le Commerce Extérieur Argentin*, No. 104). No gold ore was exported according to this authority in 1897, 1898, or 1899; neither does gold or silver bullion, crude or refined, appear in the report. Silver was contained in silver-lead and silver-copper ores, and both silver and gold were contained in copper ore, but the proportion of fine gold and silver to base metals in those ores is not stated, and there appears to be no way to ascertain it from the bulletin. In view of the fragmentary and contradictory character of the information, no change is made in the figures for 1897, viz, \$137,694 for gold, and \$495,811, United States coining value, for silver, the product for 1898 being placed at the same figures.

The following data, however, are likewise given for reference; the value is in gold piasters. The average rate of exchange on London for 1899 was computed from the bimonthly quotations, taken from the same source, at £48 9s. 16d:

EXPORTS FROM ARGENTINA.

Ores.	1899.		1898.		1897.	
	Weight.	Value.	Weight.	Value.	Weight.	Value.
	<i>Kilograms.</i>	<i>Piasters.</i>	<i>Kilograms.</i>	<i>Piasters.</i>	<i>Kilograms.</i>	<i>Piasters.</i>
Silver ore	81, 100	40, 550	10, 000	5, 000	16, 530	8, 265
Silver lead ore	78, 300	13, 520	5, 000	2, 000	6, 000	300
Silver and gold bearing copper ore.	99, 366	29, 350	48, 293	17, 500	124, 920	35, 010
Silver and copper ore	139, 750	33, 020	234, 568	58, 230	139, 648	23, 450

AUSTRALASIA.

The total gold production of Australasia in 1899 was 4,461,228 ounces, crude, containing 3,837,181 ounces, or 119,352 kilograms, fine, of the value of \$79,321,581. This is 26 per cent of the world's product, and is an increase over 1898 of \$14,460,727.

The information, as in former years, was furnished to this Bureau by the Melbourne mint, and was accompanied by the following communication:

ROYAL MINT,
Melbourne, May 10, 1900.

SIR: I have the honor to inclose the usual annual returns showing the yield of gold and silver in the several Australasian colonies up to and including the year 1899, from returns furnished by the respective governments.

I have the honor to be, sir, your obedient servant,

E. STANFIELD WARDELL,
Acting Deputy Master.

The DIRECTOR OF THE MINT,
Washington, D. C.

The total for Queensland in the following table was corrected to agree with the figures of the annual report of the under secretary for mines of that colony for 1899 (p. 6).

ESTIMATED PRODUCTION OF CRUDE GOLD IN AUSTRALASIA SINCE THE YEAR 1851.

[From returns furnished by the government of each colony.]

Year.	New South Wales.	New Zealand.	Queens- land.	South Aus- tralia. <i>a</i>	Tas- mania.	Victoria.	Western Aus- tralia.	Total.
1851-1884, inclu- sive	<i>Ounces.</i> 9, 596, 642	<i>Ounces.</i> 10, 552, 279	<i>Ounces.</i> 4, 529, 280	<i>Ounces.</i> 154, 628	<i>Ounces.</i> 378, 413	<i>Ounces.</i> 53, 023, 985	<i>Ounces.</i>	<i>Ounces.</i> 78, 235, 227
1885	103, 736	237, 371	310, 941	18, 327	37, 317	735, 218	.....	1, 442, 910
1886	101, 416	226, 668	340, 998	21, 115	31, 014	665, 396	302	1, 386, 909
1887	110, 288	203, 869	425, 923	37, 371	41, 751	617, 751	4, 873	1, 441, 826
1888	87, 503	201, 219	481, 643	16, 763	39, 610	625, 026	3, 493	1, 455, 257
1889	112, 948	203, 211	739, 103	20, 833	33, 050	614, 839	15, 493	1, 739, 477
1890	127, 460	193, 193	610, 587	24, 831	20, 510	588, 560	22, 806	1, 587, 947
1891	153, 335	251, 996	561, 641	28, 700	48, 769	576, 399	30, 311	1, 651, 151
1892	156, 870	237, 392	605, 612	38, 974	43, 278	654, 456	59, 548	1, 796, 130
1893	179, 288	226, 811	616, 940	33, 820	37, 687	671, 126	110, 891	1, 876, 563
1894	324, 787	221, 615	675, 000	35, 844	57, 873	716, 955	207, 131	2, 239, 205
1895	360, 165	293, 491	623, 000	47, 343	59, 964	740, 086	231, 513	2, 355, 562
1896	296, 071	263, 722	638, 000	29, 004	62, 586	805, 087	281, 265	2, 375, 735
1897	292, 217	251, 645	807, 928	29, 764	60, 646	812, 765	674, 994	2, 929, 959
1898	340, 494	280, 175	920, 048	49, 372	69, 549	837, 258	1, 050, 183	3, 547, 079
1899	509, 418	389, 558	946, 894	32, 990	83, 992	854, 500	1, 643, 876	4, 461, 228
Total.....	12, 852, 638	14, 234, 215	13, 833, 538	619, 679	1, 106, 009	63, 539, 407	4, 336, 679	110, 522, 165

a Quantity received at Sydney and Melbourne mints.

In the table given next on p. 259, the first column (ozs. crude) is taken from the returns furnished by the Melbourne mint, the second and the third columns from the "Annual report of the secretary of mines for Victoria," 1899; the last three columns—except in the case of Western Australia—were obtained by computation from the former at this Bureau. The yield for South Australia is given by the "Annual" as 35,000 ounces crude, which is on the face of it an estimate, and the value as £105,000. In the table below, the figure of the Melbourne

mint—32,990—was given preference, and the value—£98,970—obtained by computation at the rate of £3.0 per ounce crude, accepted by the “Annual.”

The crude weight and the value of the Queensland product are taken from the “Annual Report of the Under Secretary for Mines” of that colony (p. 6). The total value is slightly less than the yield multiplied by the average value per crude ounce, which comes from disregarding fractions of a penny in the average value; the error is, however, less than 0.1 per cent.

The figures for Western Australia have been taken from the annual report of the department of mines of Western Australia for the year 1899, which was accompanied by the following letter:

WESTERN AUSTRALIA.

DEPARTMENT OF MINES,
Perth, September 24, 1900.

DEAR SIR: I have deferred replying to your letter of the 14th April, 1900, until the annual report of the department of mines of Western Australia for the year 1899 was ready, a copy of which I have now great pleasure in sending to you.

At page 258 a table (No. 4) will be found, showing the average fineness and value of gold per ounce of each district and gold field for the year 1899, the gold of the colony having an average fineness of 0.9077 and value of £3 17s. 1½d. per ounce.

It will be noticed, from the number of representative mines which supplied the necessary data, that the foregoing is a very fair estimate of the fineness.

Returning to the subjects of inquiry in your letter. (a) Your surmise is perfectly correct that the summary on the front page of each supplement to the Government Gazette of Western Australia is neither in fine nor standard ounces. (b) Regarding the coining value of the gold output of Western Australia for the year 1900, as the subject was well ventilated in preparing the annual report for 1899, the figures given in each month's mining statistics of the current year may safely be accepted as pretty nearly accurate. (c) With many thanks for the copy of the report on the production of gold and silver in the United States for 1898,

I am, dear sir, very faithfully, yours,

H. S. KING,
Under Secretary for Mines.

MR. GEO. E. ROBERTS,
Director of the Mint, Washington, U. S. A.

The average fineness—0.9077—was obtained from eighteen gold fields, whose output was 1,261,323 ounces, out of the total for the colony of 1,643,876 ounces, or 77 per cent, of the total yield. The average value of an ounce is given as £3 17s. 1½d.; but the total value of the product is computed at the rate of £3 16s. per ounce (p. 9). This is a discrepancy of 0.16 per cent, amounting on the total valuation to £9,995, which is not accounted for.

The valuation of the product—£6,246,732—gives an average value of £4 3s. 9d. per fine ounce, which is equivalent to \$20.38. Computed as elsewhere, at the United States coining value of \$20.67+ per ounce, fine, 1,492,147 ounces represent the value of \$30,845,416; side by side with the same is reproduced, however, without change, the figure of the department of mines of Western Australia. This makes a difference of \$445,695, amounting to an increase of 1.4 per cent of the value of the product of Western Australia, and to an increase of 0.6 per cent of the total for Australasia.

On the other hand, if the estimated value of the crude product in the rest of the colonies is based upon a similar undervaluation of the fine ounce, then the fine weights calculated at this Bureau at the

United States coining rate must obviously be below the real fine contents of the crude product. As the Australasian reports give no figures for the fine product, and the same must be calculated from the estimated value of the crude product, the error is quite unavoidable. Assuming the valuation of a fine ounce all through Australasia to be approximately the same as for Western Australia—i. e., \$0.29 per ounce less than the United States Mint value, the error would be equal to 1.4 per cent on the fine weight of the product of all colonies but Western Australia, and to a decrease of 0.8 per cent on the total production of Australasia. Such errors in either direction need not be considered, and are stated here merely to explain the slight discrepancy in the tables.

VALUE AND QUANTITY OF GOLD RAISED IN THE SEVERAL AUSTRALASIAN COLONIES DURING 1899.

Colonies.	Yield.	Average value per crude ounce.	Total value.	United States value.	Weight.	Average fineness.
	<i>Crude ounces.</i>	<i>£ s. d.</i>			<i>Fine ounces.</i>	<i>Thousandths.</i>
New South Wales....	509,418	3 10 0	£1,765,390	\$8,591,270	415,604	815.8
New Zealand	389,558	3 17 6	1,513,173	7,363,856	356,226	914.4
Queensland.....	946,894	3 0 0	2,838,119	13,811,706	668,141	705.6
South Australia.....	32,990	3 0 0	98,970	481,638	23,299	706.2
Tasmania.....	83,992	3 18 6	327,545	1,593,998	77,109	918.1
Victoria.....	854,500	4 0 0	3,418,000	16,633,697	804,655	941.6
Western Australia...	1,643,876	3 17 1½	6,246,732	30,845,416	1,492,147	907.7
Total.....	4,461,228	.....	16,207,929	79,321,581	3,837,181	860.3

As seen from this table, Western Australia has rapidly pushed her way to the front among the Australian colonies, her production in 1899 well-nigh equaling that of Victoria and Queensland combined, which but two years ago were the chief producers of Australian gold.

Nearly all the increase of the gold product for 1899 came from Western Australia, while mining has remained practically stationary in Victoria, and the Queensland yield has suffered a decline.

In the following table the official figures for 1896, 1897, and 1898 are reproduced from last year's report, where the sources of information are given in detail. The last column is taken from the preceding table:

Colony.	1896.	1897.	1898.	1899.
New South Wales.....	\$5,223,506	\$5,296,762	<i>a</i> \$6,066,605	\$8,591,270
New Zealand	5,068,109	4,770,158	5,259,183	7,363,856
Queensland	10,906,493	12,424,861	<i>a</i> 16,017,860	13,811,706
South Australia.....	548,742	462,575	<i>b</i> 530,811	481,638
Tasmania.....	1,156,154	1,407,591	<i>c</i> 1,267,618	1,593,998
Victoria.....	15,671,824	15,821,303	16,298,045	16,633,697
Western Australia.....	5,201,354	12,482,461	19,420,732	30,845,416
Total.....	43,776,182	52,665,711	64,860,854	79,321,581

a Calculated according to fineness reported by deputy master, Sydney mint.
b Calculated according to average fineness (0.5201) of bullion deposited at Sydney mint during 1898.
c Calculated according to average fineness (0.8817) of bullion deposited at Sydney mint during 1898.

SILVER.

ESTIMATED PRODUCTION OF SILVER LEAD, SILVER ORE, AND SILVER BULLION IN AUSTRALASIA, TO THE YEAR 1899, INCLUSIVE.

[From returns furnished by the government of each colony.]

I.—SILVER LEAD AND SILVER ORE.

Years.	New South Wales.		Queensland.		Tasmania.		Total.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
	<i>Tons.</i>		<i>Tons.</i>		<i>Tons.</i>		<i>Tons.</i>	
1851-1884, inclusive.....	9,507	£249,400	10,159	£117,957	.....	.....	19,666	£367,357
1885	2,286	107,626	3,787	63,711	.....	.....	6,073	171,337
1886	4,802	294,485	1,631	52,797	.....	.....	6,433	347,282
1887	12,530	541,952	2,183	80,092	.....	.....	14,713	622,044
1888	29,842	1,075,737	1,190	44,015	.....	.....	31,032	1,119,752
1889	81,544	1,899,197	1,104	61,500	.....	.....	82,648	1,960,697
1890	129,039	2,667,144	1,913	56,639	.....	.....	130,952	2,723,783
1891	147,780	3,484,739	875	21,879	.....	.....	148,655	3,506,618
1892	133,355	2,420,952	.....	.....	.....	.....	133,355	2,420,952
1893	214,620	2,953,589	.....	.....	15,710	£188,520	230,330	3,142,109
1894	180,326	2,195,339	.....	.....	20,572	246,864	200,898	2,442,203
1895	219,880	1,560,813	.....	.....	20,553	246,636	240,433	1,807,449
1896	286,736	1,758,933	.....	.....	21,167	229,662	307,903	1,988,595
1897	189,018	1,681,528	.....	.....	18,364	206,595	207,382	1,888,123
1898	398,568	1,644,777	.....	.....	15,320	188,892	413,888	1,833,669
1899	444,626	1,993,744	.....	.....	31,519	250,331	476,145	2,244,075
Total.....	2,484,459	26,529,955	22,842	498,590	143,205	1,557,500	2,650,506	28,586,045

II.—SILVER BULLION.

Years.	New South Wales.	New Zealand.	Queensland.	South Australia.	Tasmania.	Victoria.	Total.
	<i>Ounces.</i>	<i>Ounces.</i>	<i>Ounces.</i>	<i>Ounces.</i>	<i>Ounces.</i>	<i>Ounces.</i>	<i>Ounces.</i>
1851-1884, inclusive.....	935,384	447,923	.....	.....	.....	280,991	1,664,298
1885	794,173	16,624	.....	.....	.....	28,951	839,748
1886	1,015,433	12,108	.....	.....	.....	26,422	1,053,963
1887	177,307	20,809	.....	.....	.....	26,321	224,437
1888	375,063	403	.....	.....	.....	27,331	402,797
1889	416,895	24,105	.....	.....	12,000	30,281	483,281
1890	496,552	32,627	.....	.....	.....	25,966	555,145
1891	729,590	28,023	.....	10,000	202,797	30,039	1,000,449
1892	350,661	22,053	203,680	.....	177,445	35,857	789,696
1893	531,972	63,076	339,267	.....	.....	40,941	975,256
1894	846,822	54,177	163,410	.....	.....	50,909	1,115,318
1895	550,142	85,024	223,759	.....	.....	50,647	909,572
1896	202,789	94,237	279,300	.....	.....	52,975	629,301
1897	150,005	183,892	234,065	.....	.....	69,633	637,595
1898	533,059	293,851	104,021	.....	.....	83,756	1,014,687
1899	692,036	349,858	145,325	.....	.....	85,687	1,272,906
Total.....	8,797,883	1,728,790	1,692,827	10,000	392,242	946,707	13,568,449

a Extracted at Melbourne mint.

The values given in the foregoing table are those of the ore, and thus include the value of the base metals in addition to that of the silver. In the absence of any data from which the percentage of fine silver contained in the ores could be determined, it was assumed in former years that the value of the ore represented only silver, which was necessarily exaggerated, and the bullion was assumed to be of standard fineness (0.925). Last year, however, the Government statistician at Sydney forwarded to this office an estimate of the fine weights for 1894, 1895, 1896, and 1897. It was impossible, he thought, to obtain accurate figures as to the production of fine silver in the colonies; the value of lead was eliminated, however, by taking as a basis the results actually obtained by the largest mining companies. The

figures for 1898 subsequently furnished were accompanied by the following letter:

GOVERNMENT STATISTICIAN'S OFFICE,
Sydney, October 30, 1899.

SIR: In continuation of my letter of June 6, 1899, I have the honor to send you the subjoined figures, which show the approximate production of fine silver in the Australasian colonies during the year 1898. The present figures are, in the same manner as those previously sent you, an estimate based on the results obtained by some of the largest mining companies:

PRODUCTION OF FINE SILVER, 1898.

	Ounces.
New South Wales	8, 802, 600
Victoria	57, 100
Queensland	54, 700
South Australia	4, 900
Western Australia.....	Nil.
Tasmania	1, 400, 600
New Zealand.....	171, 200
Total Australasia.....	10, 491, 100

I have the honor to be, sir, your obedient servant,
J. R. MARTIN,
Assistant Statistician.

GEORGE E. ROBERTS, Esq.,
Director of the Mint, Washington, D. C., U. S. A.

Joining the estimates given in the foregoing letter to those obtained from the same source last year, the following table is obtained:

PRODUCTION OF FINE SILVER.

Colonies.	1894.	1895.	1896.	1897.	1898.
	<i>Ounces.</i>	<i>Ounces.</i>	<i>Ounces.</i>	<i>Ounces.</i>	<i>Ounces.</i>
New South Wales	13, 964, 300	9, 818, 900	10, 608, 900	10, 337, 900	8, 802, 600
Victoria	38, 100	45, 400	42, 500	50, 200	57, 100
Queensland	134, 700	179, 600	191, 100	152, 900	54, 700
South Australia			8, 600	9, 300	4, 900
Tasmania	1, 787, 400	1, 362, 400	1, 324, 700	1, 200, 600	1, 400, 600
New Zealand.....	40, 800	63, 800	62, 900	127, 100	171, 200
Total Australasia.....	15, 965, 300	11, 470, 100	12, 238, 700	11, 878, 000	10, 491, 100

By comparison of this table with that on p. 260 we obtain what is termed here the fineness of the Melbourne figures for each colony. For that purpose the quantity of fine silver is first determined from the value of last year's ore product by dividing the same by the average annual price of an ounce of fine silver in the London market during the same year; the quantity of fine silver contained in last year's production of bullion is computed upon the assumption that the bullion is of standard fineness. The sum total of both figures thus obtained, which must necessarily exceed the actual weight of fine silver, as explained above, is called the crude product. The ratio of the fine weight, furnished by the government statistician, to this "crude product" is the estimated fineness. It goes without saying that these estimates are made only provisionally until the correct figures can be ascertained from authentic sources.

Following is the estimated fineness, by colonies, for 1898:

	Thousandths.
New South Wales	624
Victoria	682
Tasmania	899
New Zealand.....	583

Queensland is not included in these estimates, inasmuch as the value of its silver product for 1899 is given in the annual report of the under secretary for mines (p. 13) as £15,671, which includes “15,319 ounces, of a value of £1,724, recovered from ores sent from various fields to metallurgical works in this colony or in the neighboring colonies or in Europe.” This corresponds, at the average London price of silver for 1899, viz, 27 $\frac{7}{8}$ d. per ounce, standard, to 127,381 ounces, fine, the average fineness of a crude ounce being 0.872. From these figures the commercial value of the silver product in United States money and the United States coining value have been computed, and the results are presented in the table below.

If we will apply the foregoing percentages of estimated fineness to mint figures for 1899, given in the table above, we will have the estimated fine output of Australasia in 1899, as follows:

Colonies.	Weight.		Coining value.	Commercial value.
	<i>Crude ounces.</i>	<i>Fine ounces.</i>		
New South Wales	16,862,961	10,522,488	\$13,604,833	\$6,313,493
Victoria.....	85,687	58,439	75,557	35,063
Queensland.....	145,325	127,381	164,695	76,263
Tasmania.....	2,030,393	1,825,323	2,360,014	1,095,194
New Zealand	349,858	203,967	263,715	122,380
Total.....	19,474,224	12,737,598	16,468,814	7,642,393

It appears from the foregoing tables that the bulk of Australian silver is produced by New South Wales; so the figures for that colony would be practically characteristic for the whole of Australasia. Below are given the weight and value of silver bullion from New South Wales from 1896 to 1898, the first two columns being taken from *The Wealth and Progress of New South Wales* for 1898-1899 (p. 379), by T. A. Coghlan, statistician of New South Wales:

Years.	Quantity.	Value.	
	<i>Ounces.</i>		
1896.....	202,789	£26,518	\$129,050
1897.....	150,005	16,711	81,324
1898.....	533,059	59,278	288,476

According to the same official authority, “up to the end of 1896 New South Wales had produced nearly 89 per cent of the total value of silver raised in Australasia (*The Seven Colonies of Australasia*, VII, p. 221). It does not appear whether the value represented net Australian prices or London prices, out of which the shipper had to pay freight, brokerage, interest, and other incidentals. Assuming those to be the London prices, and computing the averages per ounce, we obtain the following table:

Years.	Average value per ounce, crude.	Average London price per ounce, fine.	Average fineness.
			<i>Thousandths.</i>
1896.....	\$0.636	\$0.676	944
1897.....	.542	.604	897
1898.....	.541	.588	920

The deviations of the average fineness assumed in the calculations of this bureau (the standard 0.925), above and below the average fineness for each year given in the preceding table, are +2 per cent and $+\frac{1}{2}$ per cent in 1896 and 1897, respectively, and -3 per cent in 1897, which are negligible quantities in estimates of this nature.

The exact quantity of pure silver contained in the ores can not be ascertained until the product has been realized in London. The value of the product is calculated, however, from the figures given in the reports of the Broken Hill Proprietary Company, which produces nearly all the silver of the colony. The total product up to the end of 1898, according to that estimate, "was approximately made up of 122,243,814 ounces of pure silver, valued at £19,958,503, and of 484,327 tons of lead, valued at £5,853,837" (p. 379). The value of the lead thus appears to be an important item, which accounts for the difference between the total value of the silver and silver-lead ore in 1899, £2,244,075, and the estimated value of the fine silver product, \$7,611,995.

From these data the percentages of the values of silver and lead in the total product could apparently be computed, as well as the ratio of the net product of lead to the weight of the ore. It would be idle, however, to attempt any estimates upon these percentages, it being learned from the same source that since 1891 the metallic contents of the ore have been rapidly falling off, while the heavy fall in the price of silver has materially changed the ratios between the values of the metals in the ore product.

THE AUSTRALASIAN GOLD PRODUCTION IN 1899.

[From the Australasian Insurance and Banking Record, January, 1900, p. 4.]

In order to show more clearly the progress of gold mining in Australia we give the following statement of the output for the last fifteen years. For every year excepting the last the quantities are taken from the annual reports of the deputy master of the Melbourne branch of the royal mint, while for 1899 the total is of our own compiling and may be subject to revision, but to far too slight an extent to appreciably affect the comparison. For value, we take £3 17s. 6d. as the average per mine ounce. This rate is slightly higher than the mint returns show, but we assume that a good deal of the raw gold exported without passing through the mints is of finer quality than that which is sent in for coinage.

PRODUCTION OF GOLD IN THE SEVEN AUSTRALASIAN COLONIES FOR FIFTEEN YEARS.

Years.	Mine ounces.	Value at £3 17s. 6d. per ounce.
1885	1,442,910	£5,591,276
1886	1,386,909	5,374,272
1887	1,441,826	5,587,076
1888	1,455,257	5,639,121
1889	1,739,477	6,740,474
Total, 5 years	7,466,379	28,932,219
1890	1,587,947	6,153,295
1891	1,651,151	6,398,210
1892	1,796,130	6,960,004
1893	1,876,563	7,271,682
1894	2,239,205	8,676,919
Total, 5 years	9,150,996	35,460,110
1895	2,355,562	9,127,803
1896	2,375,735	9,205,973
1897	2,929,959	11,353,591
1898	3,547,079	13,744,931
1899	4,462,488	17,292,141
Total, 5 years	15,670,823	60,724,439

The totals for the lustrum 1895-1899 are more than twice those for the totals for the lustrum 1885-1889.

But the most noteworthy point is the rapid expansion that has taken place since 1896. The value of the production for that year was about £9,206,000, in 1897 it increased by about £2,147,500, in 1898 by about £2,391,500, and in 1899 by £3,548,000. Thus in three years the increase has been about £8,087,000. Taking a period of ten years the increase is £10,552,000, or one of fourteen years, when in 1886 the production was at its minimum, the increase is £11,918,000.

These remarkable figures show not only that Australasia is one of the largest producers of gold in the world (probably standing second only to the United States), but that by virtue of the enormous augmentation of the yearly income, and consequently of buying power, colonial circumstances are very favorably affected.

The production, moreover, has increased in every colony, and not only in Western Australia, where the developments have been phenomenal.

A comparison of quantities for 1889 and 1899 is as follows:

Colony.	1889.	1899.	Increase.
	<i>Ounces.</i>	<i>Ounces.</i>	<i>Ounces.</i>
Victoria	614,839	<i>a</i> 862,411	247,572
New South Wales.....	112,948	509,418	396,470
Queensland	739,103	947,626	208,523
South Australia	20,833	32,990	12,157
Tasmania.....	33,050	<i>b</i> 76,622	43,572
New Zealand.....	203,211	389,585	186,374
Total	1,723,984	2,818,652	1,094,668
Western Australia.....	15,493	1,643,836	1,628,343
Total	1,739,477	4,462,488	2,723,011

a Receipts at mint. The mining department returns the output at 854,500 ounces, but we regard the mint statement as more accurate.
b Including gold in blister copper, etc., estimated at 25,900 ounces.

Apart from the Western Australian production it will be seen that six colonies show an increase of nearly 1,100,000 ounces for the ten years. The most remarkable increase is that shown by New South Wales, where without any sensational finds the industry has steadily progressed. Generally, moreover, it can hardly be doubted that satisfactory as the movement for the ten years has been, yet that in most of the colonies there is plenty of room left for mining enterprise. Methods, possibly, want revision, but there is sound reason for the belief that the Australasian colonies will still further augment their output for gold.

The figures relating to the operations of the colonial branches of the royal mint for the last two years are as follows:

RECEIPTS OF GOLD.

Location of mint.	1898.	1899.
	<i>Ounces.</i>	<i>Ounces.</i>
Melbourne.....	1,555,996	1,514,107
Sydney	719,965	948,743
Perth		209,410
Total	2,275,961	2,672,260

ISSUES OF COIN AND BULLION.

Location of mint.	1898.	1899.
Melbourne.....	£5,815,610	£5,835,270
Sydney	2,618,205	3,372,446
Perth		690,992
Total	8,433,815	9,898,708

In 1898 the quantity of gold produced that did not pass through the mints was 1,271,118 ounces, but in 1899 it rose to 1,790,228 ounces, on account, chiefly, of the increasing shipments of the large Western Australian mines direct to London. As the subject of the mintage of gold in the colonies is likely to increase in importance we compare the production and the quantity handled by the colonial mints for the last fifteen years, as follows:

Years.	Quantity.	Handled by mints.	
		Quantity.	Proportion of production.
	Ounces.	Ounces.	Per cent.
1885.....	1,442,910	1,258,593	87
1886.....	1,386,909	1,231,777	89
1887.....	1,441,826	1,367,929	95
1888.....	1,455,257	1,367,657	94
1889.....	1,739,477	1,662,406	96
1890.....	1,587,947	1,557,046	98
1891.....	1,651,151	1,592,456	96
1892.....	1,796,130	1,665,260	93
1893.....	1,876,563	1,790,578	95
1894.....	2,239,205	1,931,305	86
1895.....	2,355,562	1,852,941	79
1896.....	2,375,735	1,899,661	80
1897.....	2,929,959	2,137,328	73
1898.....	3,547,079	2,275,961	64
1899.....	4,462,488	2,672,260	60

WESTERN AUSTRALIA.

RETURN OF GOLD THE PRODUCE OF THE COLONY ENTERED FOR EXPORT FROM JANUARY 1, 1886, TO APRIL 30, 1900, SHOWING QUANTITY OBTAINED FROM THE RESPECTIVE GOLD FIELDS; ALSO THE AMOUNT RECEIVED AT THE ROYAL MINT, PERTH.

[Abbreviated from the treasury return. From Supplement to Government Gazette of Western Australia, Perth, May 25, p. 1808.]

Years.	Quantity.	Value. <i>a</i>		
	Ounces.	£	s.	d.
1886.....	302	1,147	12	0
1887.....	4,873	18,517	8	0
1888.....	3,493	13,273	8	0
1889.....	15,492.50	58,871	10	0
1890.....	22,806.31	86,663	19	9
1891.....	30,311.07	115,182	1	3
1892.....	59,548.31	226,283	11	5
1893.....	110,890.91	421,385	9	2
1894.....	207,131.31	787,098	19	9
1895.....	231,512.69	879,748	4	9
1896.....	281,265.33	1,068,808	4	8
1897.....	674,993.85	2,564,976	12	11
1898.....	1,050,183.60	3,990,697	13	5
1899.....	1,434,570.48	5,451,367	16	1
Received at the Royal Mint during 1899.....	209,306.24	.....	.....	.....

a Valuation at £3 16s. per ounce.

RETURN OF GOLD, IN OUNCES, AS REPORTED TO THE MINES DEPARTMENT.

[From Government Gazette, Western Australia, Perth, May 25, 1900, pp. 1785 and 1787.]

Gold field.	1899.	1898.	Previous to 1898.	Total.
	<i>Ounces.</i>	<i>Ounces.</i>	<i>Ounces.</i>	<i>Ounces.</i>
Kimberly	917	440	12,963	14,320
Pilbarra	19,317	14,414	35,296	69,027
West Pilbarra	1,935	327	1,198	3,460
Ashburton	1,659	501	303	2,463
Gascoyne	334	14	14	362
Peak Hill	31,954	14,970	21,954	68,878
East Murchison	45,039	37,080	23,571	105,690
Murchison	81,086	79,256	202,748	363,090
Yalgoo	12,136	3,299	10,683	26,118
Mount Margaret	80,123	49,718	27,584	157,425
North Coolgardie	117,138	72,879	88,325	278,342
Broad Arrow	48,309	27,726	23,594	99,629
Northeast Coolgardie	112,846	170,441	49,429	332,716
East Coolgardie	855,405	422,392	440,593	1,718,390
Coolgardie	131,273	99,673	138,973	369,919
Yilgarn	16,372	11,769	111,267	139,408
Dundas	44,357	36,798	23,263	104,418
Donnybrook	511	15	.....	526
Gold fields generally	1,279	.....	.....	1,279
Total	1,601,990	1,041,712	1,211,758	3,855,460

NOTE.—The difference between the statement headed "Return of gold in ounces, as reported to the mines department," and the one compiled by Her Majesty's customs is to be accounted for by the fact that the exportation of gold started, practically, with the inception of the industry, whereas the mode of collecting returns adopted by the mines department is the elaboration of a system established some three years ago. Up to that date, therefore, no good basis for an exact comparison can be found. As to the discrepancy which exists at present, the assumption is that the whole of the gold won from the soil is not reported to the department.

The position as the leading gold producer among the colonies which West Australia assumed in 1898 is rendered far more preeminent in 1899, its output in that year having increased by close upon 600,000 ounces, raising it to a total of 1,644,000, which is not far short of the production of Queensland and Victoria combined.

* * * * *

At Kalgoorlie the group of rich mines have developed well in depth, but outside of "the square mile" there have been only one or two discoveries of importance. Coolgardie appears to be slowly dying, and there are only three or four mines in the district really working at a profit. Menzies, Norseman, Southern Cross, Broad Arrow, the Murchison, are all in much the same condition as previously—waiting for the application of capital, which, on the known facts about these fields to date, is rightly adopting a hesitating attitude. The little army of prospectors, however, undaunted by disappointments, are gradually moving on farther and farther into the desert, and it is in the far inland districts, such as Peak Hill, Lake Way, Mount Leonora, and Mount Margaret that most interest (outside of Kalgoorlie) has been centered, and in which, during the last year or two, some discoveries of real importance have been made. The fact that here and there over the great gold belt of West Australia new patches of payable ore are continually being found—each year farther in the desert than before—even assuming that none of these patches are large enough or permanent enough to become a standard gold mine, is a point greatly in the colony's favor. The present mining population will find continuous employment, the agriculturists a good market, the railways a handsome revenue, and the colony will, doubtless for years to come, stand as a gold producer in the front of all our Australasian possessions. To this extent I see a satisfactory future ahead for West Australia; but as regards the hundreds of wild-cat mines—the results of earlier "booms"—there is no hope for these.

And now as to the value of Kalgoorlie as a gold field. Kalgoorlie, fine field as it is, has been overrated, and all the mines have been credited with possessing much more rich ore than they really have. The reason is easily explained. The lodes are now clearly proved to be not permanent formations, but simply lenses of ore, which make and die out suddenly, become rich or poor without any reason, and whose continuance in length, depth, or value can be predicted with no certainty whatever. On the whole, these lenses of ore are more continuous in depth than in length, a very favorable feature, but although frequently of considerable thickness, the gold contents are so variable that most of the ore developed on any given level will probably be found unpayable. On the upper levels the ore bodies were naturally of greater width than below in the hard rock, and a great deal of ore, worth about 10 or 15 pennyweights and easily mined and milled, was treated, so that the first and second

levels of these mines contained far more payable ore than any of the lower levels are likely to contain. It must not be inferred from this that the mines are getting poorer in depth. On the contrary, there is evidence that a new lens of width and value is making in the Great Boulder at 1,000 feet, and another, also of great value, in the Perseverance at 500 feet deep, but it must be clearly realized that instead of immense reserves of payable ore, as the mines were supposed to possess, they only possess large reserves in the most favorable cases and moderately good reserves in the case of the rest.

Of course this group of mines, collectively, has a great future, and Kalgoorlie is undoubtedly second only to Johannesburg among the gold fields of the world. There is no doubt that the ore continues in depth and carries highly payable gold. The Great Boulder has been proved to be 1,110 feet; Associated, Kalgurli, South Kalgurli, to 600 feet; Lake View, Ivanhoe, Golden Horseshoe, Boulder Perseverance, 500 feet, and Hannan's Brownhill to 400 feet. Outside of these principal mines there are several stretches of reef being exploited which are yielding considerable patches of payable ore and which may yet become more permanent as depth is attained, but the tendency at Kalgoorlie and on the London market is to absurdly overrate these developments.

(Taken from the *Economist*, London, February 24, p. 264; May 26, p. 738; and June 2, 1900, p. 774.)

THE GEOLOGY OF WEST AUSTRALIA.

[Translated from "Glückauf," August 25, 1900.]

The geological conditions of the country, upon which the attention of all geologists, miners, and financiers has been directed since the discovery of considerable quantities of gold, is described by the French investigators, M. Garnier and his son, in nine propositions presented to the Academy of Sciences:

1. The country consists everywhere of granite, which is cut through by very long, perpendicular, parallel seams of diorite extending from north-northwest to south-southeast.

2. In addition to hornblende and feldspar crystals, these seams often contain gold in almost invisible grains and in quantity of 2 to 3 grams per ton diorite.

3. The diorite zones show concentrations of metal, which accordingly as it runs and slopes, contains mostly native gold, iron oxide, pyrites, galena, lead chromate, as well as yellow and black telluride; of the last, the black contains mercury, gold, and silver as basic radicals; the yellow, however, contains only gold.

4. To the eye, the ore zones are distinguished from the diorite itself only by an apparent lamination, which indicates the effect of ligation corresponding to their higher density.

5. The granites, all of which include more or less ore-bearing diorite, often fuse in contact with it and occasionally contain gold themselves. This, as well as other phenomena, the description of which is omitted by the authors for lack of space, justifies the assumption that all the rocks are of common origin, their present diversity being due to a later rearrangement of the elements according to chemical affinity (through cleavage, which must have preceded or accompanied the solidification of the magma).

6. The diorite, which is of deep green color and therefore with an iron protonide base (in places graphite groups have been found in its masses), forms an apparently connected magnetic whole, which would explain the regularity of the seams running almost from north to south.

7. The ordinary denudation has resulted here in the formation of an immense plateau, covered with the most resistant particles of the vanished rocks. These are sometimes spread out in a thick layer of sand and quartz conglomerate, of countless fragments of quartz mixed with ferric hydrate in masses of every size, and, finally, of native gold.

8. The gold, which is invisible to the naked eye and comes originally from the old rocks, is easily dissolved by the waters, which are rich in minerals. The waters have here followed their course on the surface and in the ground in such a fashion that the whole superficial alluvial deposit is always more or less rich in deposited gold. This explains the origin of the alluvial gold. Often the acidified and gold-bearing solution has been able to penetrate into the old rock—namely, when the latter was especially rich in minerals containing alkalies. The alkalies were in time destroyed and replaced by a sediment of gold silica and other materials, hence the origin of veins. Finally, when the same waters entered in the same fashion into the above-mentioned zones, which were already rich in ore and contained gold, they enriched the zones with gold to an unusual degree.

9. The waters containing the minerals finally penetrated into the most compact granite and diorite rock masses, especially into those containing pyrites or feldspar, and formed there real veins out of moving water, which often run parallel, form

groups, separate, change the dip, etc., according to the way of most veins; but they are always characterized by the clearly laminated structure which they impart to the compact primary rock.

* * * * *

GOLD MINING IN VICTORIA.

[From Annual Report of the Secretary for Mines, Victoria, 1899, p. 8.]

The yield of gold for the year 1899 amounted to 854,494 ounces 12 pennyweights. The calculation was made as shown hereunder:

Victorian unmined gold received at the Melbourne mint during the	Ozs.	dwt.
year 1899	862,411	9
Quantity of Victorian unmined gold purchased by the New South		
Wales mint during the year 1899	259	15

Difference in quantities of unmined Victorian gold held by the banks	862,671	4
on December 31, 1898, 86,144 ounces 2 pennyweights, and the same		
date of 1899, 77,972 ounces 10 pennyweights. The difference being in		
favor of the former, it is consequently deducted from the mint return.	8,171	12

Total yield for year	854,499	12
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The return for each month of the last three years was as follows:

Months.	1897.	1898.	1899.
	Ozs.	Ozs.	Ozs.
January	27,676	43,760	51,378
February	49,667	61,851	59,317
March	83,443	69,143	74,213
April	71,437	65,395	61,968
May	66,604	63,772	67,796
June	60,641	78,795	80,621
July	81,055	64,423	67,495
August	66,493	82,099	81,768
September	68,052	70,605	68,915
October	74,278	74,278	64,788
November	70,178	65,792	75,446
December	93,242	97,344	97,687
Total	812,766	837,257	854,500

Subjoined is a statement of the yield of gold in Victoria for each year since the first discovery, in 1851, up to the end of December, 1899.

It may be noted that the quantity won during 1899 was only exceeded once for the last 22 years, or since 1876.

GOLD PRODUCTION OF VICTORIA.

Year.	Ounces.	Year.	Ounces.
1851	212,899	1878	758,040
1852	2,286,535	1879	758,947
1853	2,744,098	1880	829,121
1854	2,218,483	1881	833,378
1855	2,819,288	1882	864,610
1856	3,053,744	1883	780,253
1857	2,830,213	1884	778,618
1858	2,596,231	1885	735,218
1859	2,348,703	1886	665,196
1860	2,224,069	1887	617,751
1861	2,035,173	1888	625,026
1862	1,730,201	1889	614,833
1863	1,694,819	1890	588,560
1864	1,622,447	1891	576,399
1865	1,611,554	1892	654,456
1866	1,546,948	1893	671,126
1867	1,501,446	1894	716,954
1868	1,634,918	1895	740,086
1869	1,544,756	1896	805,087
1870	1,304,304	1897	812,766
1871	1,368,942	1898	837,257
1872	1,331,377	1899	854,500
1873	1,170,397		
1874	1,097,643	Total	63,539,205
1875	1,068,417		
1876	963,760	Value at £4 per ounce	£254,156,820
1877	809,653		

In the earlier years of the gold-mining industry no proper official record was kept of the amount of gold raised annually in the colony, and the amounts above are the returns of gold exported and inclusive of 1,267,241 ounces, which were produced in Victoria in 1852-1855, but passed through the customs of New South Wales, Tasmania, and South Australia. The estimates generally for each year from about 1860 to 1893 have been compiled from returns received from the mining registrars. The yields since 1894, inclusive, have been calculated as shown above.

NEW SOUTH WALES.

[From The Mining World and Engineering Record, March 10, 1900.]

The past year has been one of exceptional prosperity so far as the mining industry of New South Wales is concerned, the output of gold for 1899 exceeding half a million ounces, the largest quantity obtained since 1862, or thirty-seven years ago, and exceeded only in that year and in 1852 and 1853, showing that the sources of gold production in that colony remain far from being exhausted. The actual value of the gold obtained in New South Wales to the end of 1899 was £47,737,183, which illustrates the richness of the New South Wales gold mines. The introduction of the gold-dredging industry will tend to increase the rate of production, and it is anticipated that the output of the precious metal in 1900 will largely exceed that of 1899. Another source of increase will be found in the improved systems of dealing with the tailings, or gold-washing refuse. A larger percentage of gold is extracted than formerly, and at less cost, but there is plenty of room for improvement. The value of the silver and silver lead raised to the end of 1898 was £25,812,340. Most of this was obtained at Broken Hill. Should the experiments in connection with the extraction of zinc from the tailings and other residue at the Broken Hill mines prove successful, the losses occasioned by the increasing quantity of refractory ore will become abundantly recouped. There must be at least 500,000 tons of such products on the surface of the Barrier leases, and for years this was regarded as waste material. Though too early to accept the optimistic view that the zinc problem has been solved, yet there is no doubt that rapid strides in this direction are being made, and it is quite likely that the magnetic system of separation will eventually prove to be the method generally adopted. Some idea of the extent to which mining operations are carried on at Broken Hill is afforded by the fact that the Proprietary Mine has, during the few years of its existence, produced about 4,200,000 tons of ore containing 400,000 tons of lead and 100,160,000 ounces of silver. The value of these products exceeds £20,000,000, the expenses of production amounted to £11,700,000, and £7,000,000 was expended in dividends. The Broken Hill mines give direct employment to 20,000 men, and indirectly to quite as large a number. Two miles along this immense lode and a somewhat similar distance along the Kalgoorlie golden belt are probably the two richest metalliferous pieces of ground in the world. The recent cutting of the Broken Hill silver lode at a depth of 1,015 feet is regarded as possessing great significance. The lode is over 40 feet wide, and carries metals as follows: Sixteen and one-half ounces of silver, 13.3 per cent of lead, 17 per cent of zinc, and 1 pennyweight 7.36 grains of gold per ton. This proves that the lodes live down; that they continue of massive dimensions; that they carry metal in payable quantities, and it is noteworthy that the gold contents are increasing. This shows that the Broken Hill silver-mining industry has many years of prosperity before it.

TASMANIA.

[The Economist, August 11, 1900.]

The prevailing class of ore in Tasmania is of a complex nature, containing silver, lead, zinc, copper, gold, and some of the baser metals in various permutations, and there are also numerous deposits containing tin. Few of the lodes or deposits carry only one mineral. In connection with this point it is interesting to note that in a country with so much mineral wealth as Tasmania there are at present only two gold mines of any note; that is to say, only two mines which produce gold as a single product. These are the Tasmania and Golden Gate mines, both in the northeastern district of the island, and both owned by local shareholders. These two mines have paid in dividends an aggregate of about a million sterling, and their present rate of production is from 1,500 to 3,000 ounces a month. Each has ore developed for several years ahead. Numerous smaller gold mines have been worked in Tasmania in years gone by, but these have all come to an end, owing greatly to lack of capital and of enterprise. Little is apparently being done to resuscitate these gold mines, or to pros-

pect the gold districts, and the collective mining and speculative interests of the Tasmanians and of Melbourne mining people have shifted of late years to the complex ore deposits of the West Coast.

The west coast of Tasmania is mountainous, inaccessible, covered entirely with dense primeval forest, and subject to probably the heaviest rainfall on the face of the globe; but, as a compensation, it is undoubtedly rich in all sorts of minerals, and is now being subjected, in the face of extreme difficulties, to a great deal of superficial and to some sound and scientific development and exploitation. Much has been written in the Australian press about the marvelous richness of the West Coast, but it is usually the mere hysterical gush which in Australia passes current for mining criticism. This sort of thing gives an entirely wrong idea, not so much of the district generally, which is rich in a variety of metals, and over a large area too, but of the individual mining problem which has to be tackled, and on which the real success of Tasmania's future as a mining country depends. The difficulties to be surmounted before any given mining deposit can be worked at a profit are enormous, and many of the small local companies have run short of funds before being able even to prove the value of the ores known to exist in their ground. Railways are absolutely necessary; but their construction through the forests and over the mountains is a costly matter, and the problematical value of the ore bodies which they would be built to exploit, lends a decidedly speculative air to their construction. And yet every single mine over this great mountainous forest-covered area must be connected with a railway if it is to work profitably. * * *

Under the most favorable and rapid development it will take years yet to connect many of the mines already floated with the railways. In the meantime these mines will be entirely unproductive. From time to time the more unscrupulous of the managers of these sordid mines will publish accounts of rich strikes and the assay results from small picked specimens of the ore just to keep things going, but no real and permanent development will be undertaken, because few of the mines have much working capital, and many of them, when the truth comes to be known, will not pay for development.

And yet, with it all, the west coast of Tasmania is a big and important mineral area and some day may make a stir in the world, only it will take a long time, and each mine must bring in a railway over the mountains and through the dense forests to its very door.

A private railway belonging to the Van Diemens Land Company (which owns large tracts of land in this part of the island) runs to the famous Mount Bischoff tin mine at Waratah. From a point near Waratah the railway is continued to the south by the Emu Bay Railway Company, a Melbourne venture, and will eventually be carried through to Zeehan. On or near the line of this railway lie the Rosebery, Mount Black, Mount Reid, Hercules, Curtin Davis, and numerous other deposits or series of reefs and very many small prospecting mines. * * * These ores are principally copper, with silver and a little gold. They are rich in places, but patchy, and by no means yet properly or systematically developed. These ores, owing to their complex nature, will not only be difficult to treat, but they contain so much zinc, as well as arsenic and antimony, that the owners of smelting works will find great difficulty in treating them at all. Beyond these again, to the south, are the well-known silver-lead mines of Dundas and Zeehan. The town of Zeehan, containing probably 8,000 inhabitants, is connected with Port Macquarie by a government line of railway and has been an important mining center for about ten years. The galena reefs of the district betray the usual characteristics of galena—extreme patchiness and irregularity—and most of the mines, which are nearly all owned locally, have not come up to the expectations formed of them in the early days of the field.

AUSTRIA-HUNGARY.

According to official information received by this Bureau, Austria's output of gold in 1899 was 387,130 kilograms of gold ore, valued at 61,982 crowns, or \$12,582.35, representing 19 kilograms, or 609 ounces, fine.

The amount of silver obtained in 1899 from Austria's mines was 21,554,570 kilograms of ore, valued at 3,714,608 crowns, or \$754,065.42 (commercial value), representing, at the average price of silver during the year, viz, \$0.60 per ounce, fine, 1,256,776 ounces, or 39,098 kilograms fine, of the coining value of \$1,624,922.

According to official reports Hungary produced in 1899 2,906 kilograms of fine gold of a coining value of 9,531,680 crowns, equal, at

the United States coining value, to \$1,931,328, and representing 93,428 ounces fine. The output of silver amounted to 19,863 kilograms fine, of a "redemption" value of 2,264,352 crowns, which was equal to \$825,506, United States coining value, representing 638,477 fine ounces.

The above results are presented in tabular form as follows:

GOLD.

Country.	Fine weight.		Value.
	<i>Kilos.</i>	<i>Ounces.</i>	
Austria	19	609	\$12,582
Hungary	2,906	93,428	1,931,328
Total	2,925	94,037	1,943,910

SILVER.

Country.	Fine weight.		Coining value.
	<i>Kilos.</i>	<i>Ounces.</i>	
Austria	39,098	1,256,776	\$1,624,922
Hungary	19,863	638,477	825,506
Total	58,961	1,895,253	2,450,428

BOLIVIA.

Our returns from Bolivia estimate the production of gold for 1899 as approximately equal to its exportations.

"The exportation of fine gold was 103 kilograms, its official value being 88,000 bolivianos," writes our representative at La Paz, Bolivia.

The value of 103 kilograms, fine, is \$68,454, representing 3,311 ounces fine.

The production of silver, according to the same returns, was given at 1,286,426 kilograms, of a commercial value of 14,991,673 bolivianos.

At the average price of silver for the year (\$0.60), the boliviano was worth \$0.434. At this rate the commercial value of the silver product amounted to \$6,506,386, representing, at the average price of silver for the year, 10,843,977 ounces, or 337,355 kilograms, fine, of a coining value of \$14,020,495.

No statistics of precious metals are published in Bolivia. She has no seaports, and practically all of her foreign trade is carried on through the Chilean port of Antofagasta, where it is separately recorded at the custom-house as Bolivian transit trade.

The figures of her gold and silver exports are contained in the "Estadistica Comercial de la Republica de Chile" for 1898, pp. XXXIV and XXXV, from which the table given below is compiled. (Values originally given in pesos have been reduced to United States money.)

EXPORTS OF GOLD AND SILVER IN 1898.

Description.	Weight (crude).	Value.	United States value (commercial).
	<i>Kilos.</i>	<i>Pesos.</i>	
Gold bullion	39	48,107	\$17,559
Silver—			
Bullion	53,138	4,357,282	1,590,408
Ore	17,252,792	17,252,792	6,297,269
Sulphides	87,357	2,620,410	956,450
Total silver	17,393,287	24,230,484	8,844,127

The value of gold in this table represents 26 kilograms, or 851 ounces, fine.

At the average price of silver for 1898 (\$0.59), the commercial value of the silver exports in the above table corresponds to 14,990,046 ounces, fine, of a coining value of \$19,381,070. Adding hereto the coinage for 1898, \$1,348,094, the total production is found to be \$20,729,164, representing 16,032,713 ounces, or 498,777 kilograms, fine.

These figures are taken by this Bureau as the estimated product of silver for 1898. In this estimate no account is taken of the exports of other silver-bearing ores, in which silver occurs in combination with other metals, whose value is an important element in the value of the ore; the quantity of fine silver can only be ascertained after the ores are worked. The weights and values of these ores, as appearing from the Chilean export statistics, are given in the following table:

Description of ore.	Weight.	Value.
	<i>Kilos.</i>	<i>Pesos.</i>
Lead.....	2,053,861	410,772
Copper.....	6,103	1,343
Total.....	2,059,964	412,115

Should these ores be included in the silver product, completely disregarding the value of the base metals, the total exports of silver would be increased by 412,115 pesos, which is less than 2 per cent of our estimate. On the other hand, silver ore usually contains an admixture of lead of some value, which may appear in the estimated value of the ore. How much of an allowance should be made on that account can not be ascertained. It is safe to assume, however, that it need not be more than sufficient to make up the deficiency of 2 per cent mentioned before. Indeed, an allowance of 2 per cent for lead on the total estimated value of the silver product would amount, in round numbers, to \$176,000; figured at the highest rate paid in the London market during 1898—£14 15s. per ton, equal to \$71.78—it represents the value of 2,450 tons of lead, which would correspond to an average yield of 14 per cent. This is double the amount secured in 1898 by the Broken Hill Proprietary Company, the most important producer of Australia. (The Mineral Industry, p. 440.)

To sum up, the probable error in the estimate of this Bureau can not exceed 2 per cent in either direction.

The New York Journal of Commerce has the following on gold mining in Bolivia:

No accurate information of the yield of gold can be obtained, but rich alluvial and quartz deposits are known to prospectors in many different localities. Some of these are, however, above the line of perpetual snow, and climate and other natural physical obstacles have impeded any substantial work hitherto in the direction of practical gold mining. At present most of the gold recovered is the product of washings by Indians in river beds and streams, the quartz reefs not having yet been touched for want of proper machinery and competent miners to supervise operations of this nature.

BRAZIL.

Accurate official statistics of gold production are lacking in Brazil, but gold pays an export duty to the State, which enables the State gov-

ernments to keep track of the gold exports. The principal gold-producing State of Brazil—Minas Geraes—is the only one from which an official report has reached this office. It is the report for 1900, presented by the State secretary of financial affairs to the president of the State of Minas (*Relatorio apresentado ao Presidente do Estado de Minas pelo Secretario de Estado dos Negocios das Finanças David M. Campista em 1900*). The director of the State treasury complains, however, that a large portion of the gold exports escapes the payment of the tax (*Vol. II, p. 9*). The figures which are given below must therefore fall considerably short of the actual production of gold in Brazil.

The last two columns in the table below were computed at this Bureau:

GOLD EXPORTS TO FOREIGN COUNTRIES FOR THE YEARS 1896 TO 1899.

[From the report above mentioned, "Comparative table of internal and external revenues," No. 49.]

Year.	Weight.	Value.				Average value of the milreis for the year.
		<i>Milreis.</i>	£	s.	d.	
1896.....	<i>Kilos.</i> 1,962.767	5,311,247.502	193,630	18	4	\$942,305 \$.1774
1897.....	2,071.243	6,487,148.736	202,720	6	8	986,539 .1521
1898.....	3,267.080	10,934,856.760	318,930	6	8	1,552,074 .1418
1899.....	3,973.710	12,998,005.410	419,720	12	6	2,042,570 .1571

From the above table it will be seen that the average yearly value of the milreis (inconvertible paper, the money of account of Brazil) fluctuated during the four years from \$0.1418 to \$0.1774.

The estimates for 1896, 1897, and 1898, given in this table, exceed the official figures of the government of Minas by 51,625 ounces, or 23 per cent.

No gold was coined in Brazil in 1898, and none was reported for 1896 and 1897. How that difference should be accounted for, must remain an open question.

No returns for 1899 have been received from Minister Bryan. For want of better information the exports for 1899 must be taken as indicating the production of Brazil.

The table below gives the gold shipments from Minas Geraes to other states, as well as to foreign countries; the value in Brazilian milreis is reduced to United States values at the average rates of exchange stated in the foregoing table; from the United States values the numbers of fine ounces and kilograms are computed:

GOLD SHIPPED FROM MINAS GERAES TO OTHER STATES AND FOREIGN COUNTRIES.

[*Relatorio, etc., p. 21; also Anexo, No. 15.*]

Years.	Weight.			Value.		
	Crude.	Fine.	Fine.	Milreis.	Average of a milreis.	United States.
	<i>Kilos.</i>	<i>Kilos.</i>	<i>Ounces.</i>			
1896.....	1,988.527	1,441	46,317	5,397,169.233	\$0.1774	\$957,458
1897.....	2,233.944	1,644	52,864	7,184,685.764	.1521	1,092,791
1898.....	3,090.205	2,308	74,194	10,816,072.823	.1418	1,533,719
1899.....	4,192.414	3,234	103,983	13,682,554.467	.1571	2,149,529

It will be noticed, upon comparing these two tables, that there is a discrepancy between the figures for 1898, viz, that the weight and value given in the latter falls short of that given in the former for that year, whereas in all other years the figures of the latter exceed those of the former. In other words, the exports from Minas Geraes to foreign countries alone in 1898 are stated to exceed the total exports, both to foreign countries and other states.

The secretary of our legation in Brazil, Mr. Dawson, made a visit to the gold mines of Minas Geraes. From his report, published in extenso in last year's report upon the production of precious metals (pp. 179-182), the following is reproduced here for reference:

I investigated the historical data still preserved as to the gold production of Minas and inquired of the best local sources as to its probable present amount. Fairly complete statistics exist of the amount of taxes collected in colonial times. Since the Government took one-fifth of all the gold produced the computation is easy. The output of the larger mines in this century is also known. The contraband production of the last century and that of the smaller private mines in this can only be estimated. The gold production of Minas has been approximately as follows:

Years (inclusive).	Per year.	Total.
	<i>Ounces.</i>	<i>Ounces.</i>
1700-1713	10,000	140,000
1714-1725	90,000	1,080,000
1726-1735	135,000	1,350,000
1736-1751	303,000	4,850,000
1752-1766	320,000	5,120,000
1767-1777	230,000	2,530,000
1778-1808	140,000	4,340,000
1809-1834	34,000	890,000
1835-1890	58,000	3,250,000
1891-1898	75,000	600,000
Total.....	a 121,000	24,150,000

a Average per year.

BRITISH INDIA.

The director-general of statistics of British India informs this Bureau that the production of gold in British India from 1892 has been as follows:

Years.	Weight (0.916 $\frac{2}{3}$ fine).	Fine weight.	Value.
	<i>Kilograms.</i>	<i>Kilograms.</i>	
1892.....	4,993	4,576.916	\$3,041,818
1893.....	6,262	5,740.166	3,814,914
1894.....	6,371	5,840.083	3,881,319
1895.....	7,643	7,006.083	4,656,243
1896.....	10,063	9,224.416	6,130,547
1897.....	11,896	10,904.666	7,247,241
1898.....	12,773	11,708.583	7,781,524
1899.....	13,981	12,815.916	8,517,458

No silver is produced in India.

Further details on Indian gold mining results are tabulated from the figures given in an article in the London Economist of February 3, 1900, page 151.

The production of gold in British India for the last four years, expressed in ounces, was as follows:

	Ounces.
1896.....	321,878
1897.....	389,779
1898.....	416,236
1899.....	448,071

During the last year 11 companies contributed to the aggregate of 448,071 ounces; but of this amount 419,823 ounces, or about 93 per cent of the whole, was yielded by the four dividend-paying mines, whose results are shown in the following table, contrasted with those of the preceding year:

GOLD.

Mines.	1899.		1898.	
	Ounces.	Value.	Ounces.	Value.
Champion Reef	159,101	£603,723	140,158	£530,330
Mysore	155,786	607,105	159,374	623,270
Nundydroog	43,654	164,145	31,223	117,635
Ooregum	61,282	229,294	52,585	196,600
Total.....	419,823	1,604,267	383,340	1,467,835

The average returns obtained in 1899 at the four mines last mentioned from milling operations, as well as by the treatment of the tailings by the cyanide process, are shown in the following table:

Mines.	From mill- ing opera- tions.		From the tailings.
	Oz.	Dwts.	Dwts.
Champion Reef	1	7½	4¾
Mysore	1	12	2¼
Nundydroog	1	2	2½
Ooregum.....		15½	3

GOLD MINING IN 1898.

[The Mining World and Engineering Record, April 28, 1900.]

A report on the mining industry for the year 1898 was recently submitted to the government of Mysore by Mr. W. F. Smeeth, the chief inspector of mines in the geological department of that State. This is the first report of the kind that has appeared, and though the writer does not consider that the information which it contains is as complete as could be desired, yet the figures which he gives are, he believes, "very approximately accurate." He shows that the mining industry in Mysore during the year under notice was practically confined to gold mining. * * *

The increase and the improvement generally of the machinery and equipment during the year are alluded to, and it is stated that both have been brought more into keeping with modern requirements; but the chief inspector considers that "considerable room for improvement still remains in many respects." He remarks that the "antiquated and expensive method of pan amalgamation is tardily dying out on the field," and he hopes "it will soon be quite defunct, as the pan process is three times as expensive as the cyanide process." It seems to him probable "that much of the old slimes which have been through the pan process will pay to re-treat by cyanide, and work on these has actually been commenced in some cases." The average weight of the stamps was 930 pounds, and the average amount of ore crushed was 2.19 tons per twenty-four hours. This low rate of crushing is largely attributable to the necessity for fine crushing in order to obtain a satisfactory extraction by the cyanide process; but Mr. Smeeth is of opinion that the rate "might be increased with advantage, partly by the use of heavier stamps, and partly by the introduction of further reducing machinery between the coarse rock breakers and the stamps, either of the nature of finer reciprocating crushers or of coarse rolls."

The average assay value of the ore milled was 107.5 shillings per ton, and the value of the gold won represented 93.4 shillings per ton milled. The total percentage of extraction was therefore almost 86.9 per cent. Mr. Smeeth expects that when all the mill tailings are dealt with by the cyanide process the extraction will increase to 89 or 90 per cent. The gold obtained from the tailings by the cyanide process averaged 53.6 per cent of the gold that the tailings were shown by assay to contain. This percentage seems to Mr. Smeeth to be rather low, and its increase may, he thinks, be anticipated, but he makes the cautious remark that he is not "in a position to offer an opinion on this point."

The average working cost during the year for all the Kolar mines for which figures were obtainable was 38.5 shillings per ton of ore milled, exclusive of office and administrative expenses in London.

* * * * *

Native labor is obtainable at a cheap rate, though it may not be very efficient, and the high price of fuel necessarily influences expenditure disadvantageously. * * *

A great deal of time and strength that are paid for is lost in consequence of the necessity imposed on the workmen in most of the mines to travel long distances up and down ladders. Only two of the mines have vertical shafts provided with cages for raising and lowering the workmen, but similar shafts are now being sunk at most of the other mines, and when they are completed a serious defect in the equipment of the mines will be overcome.

MINING IN 1899.

[From the Mining World and Engineering Record, January 20, 1900.]

There are two interesting facts worth mentioning in connection with Indian gold mining. The first is that, unlike the gold fields of Australasia, California, South Africa, and elsewhere, the pioneers were not attracted thither by discoveries of phenomenally rich ores on the surface, but rather in consequence of the extensive native workings that abounded, and the evidences of the existence of the precious metal that were to be found, particularly in temples devoted to heathen deities. It is said that an inscription in the temple at Tanjore first drew attention to the fact that gold existed in abundance in India. In the second place, it is interesting to remember that the Kolar gold field, from which practically the whole of the Indian gold output is now being obtained, covers only about 10 miles from end to end, and the producing mines occupy but a very small portion of this area. It is therefore one of the smallest gold fields in the world, and is remarkably rich for its size. With the increased facilities which the government of Mysore are now, however, offering to prospectors and others it is probable that in the near future considerable mining activity will be seen in the outlying districts, and particularly in the promising region to the north of the Kolar field.

The total production of gold for 1899 amounts to 448,071 ounces, which is 31,835 ounces more than the output for the previous twelve months. * * *

Last year's aggregate output would undoubtedly have been increased by at least 6,000 ounces had it not been for the unfortunate outbreak of bubonic plague, which for a time caused a complete disorganization of the native labor. Upon the appearance of the pestilence in the mining camp there was a general stampede of coolies, and the greatest difficulty was experienced in keeping a sufficient number of hands at work to maintain the returns at anything approaching normal figures. Many of the underground workmen had to do the work of mill hands, and in this way the reserves of ore have in some instances fallen off.

* * * * *

We propose now to briefly mention the principal features of development in the various properties. Dealing first with the Mysore mine, the most interesting part of the property, and the one which has received particular attention during the past year, is the central section lying to the north of Ribblesdale's shaft, where are situated the two famous pay shoots known as the Champion and Crocker's. Ribblesdale's shaft at the date of the last report (December 20, 1899) had reached a depth of 2,123 feet. Levels north and south have been driven to a depth of 2,020 feet, the distance driven being 244 feet and 195 feet, respectively. A rich and wide lode was encountered in the course of driving the 1,820-foot level north, although the end just now appears to be worth not more than 13 pennyweights to the ton. The 1,920-foot level north has reached a distance of 601 feet from the shaft, and the lode is reported to be 4 feet wide and worth about three-fourths ounce to the ton. It has not yet, however, been driven far enough to come into the rich ores met with in the upper levels. Another interesting feature in the development during the past year is the improvement which has taken place in the lode in Tennant's shaft. At a depth of 1,035 feet it was worth just under 2 ounces to the ton, but it has since fallen off to about 10 pennyweights. Levels have been commenced north and south at 930 feet, and in the north drive, 56 feet from the shaft, the lode is 1 foot wide and worth 1 ounce 12 pennyweights 16 grains to the ton. This has the appearance of being another valuable shoot of ore, and is quite distinct from those portions of the mine that are at present supplying quartz for the mills * * *

At Champion Reef excellent results continue to be obtained from the development in depth of the main shoot of ore between Garland's and Ribblesdale's shafts. In sinking Garland's shaft the reef has been found to vary in width from 6 inches to 2 feet, and in value from 10 pennyweights up to 1 ounce 12 pennyweights. At the date

of the last report (December 23, 1899) it had a width of 5 inches, and was worth $1\frac{1}{2}$ ounces to the ton. A very decided improvement has taken place in the 1,440-foot level south of Garland's shaft, where the lode is reported as 9 inches wide, assaying 1 ounce 7 pennyweights per ton. The superintendent thinks that at this point they are on the top of "another run of ore ground." The 1,340-foot level north has been driven a considerable distance during the year, and the average assay value of the reef was $1\frac{1}{2}$ ounces, but from the last report we notice that it had become pinched and was temporarily suspended. In the level above—the 1,240-foot level—the reef has varied from 6 inches to 7 feet in width, and the assays have ranged between one-half ounce and 1 ounce 12 pennyweights to the ton. Mr. Taylor, at the recent meeting, described this as "a very fine length of stopping ground." Ribblesdale's shaft has reached a depth of 1,429 feet. The bottom level—the 1,340-foot level—is being rapidly pushed south, and is expected soon to be in a long shoot of rich quartz. The last report states that the lode is showing signs of improving. The 1,240-foot, the 1,140-foot, and the 1,040-foot levels south have all been opening up rich ore ground. * * *

Mention must be made also of the developments at Rowe's shaft, the bottom of which is now through the dike, and a good and wide reef is exposed. At the 1,085-foot and the 1,000-foot levels north of Rowe's shaft there has been a 15-foot lode worth close upon 3 ounces to the ton. * * *

The Ooregum mine, according to the superintendent's report dated November 20, 1899, had reached a depth of 1,721 feet, and the lode was $2\frac{1}{2}$ feet wide and worth 1 ounce 17 pennyweights 21 grains. New levels are now being driven north and south at a depth of 1,710 feet, but they have not yet been extended far enough to enter the rich runs of ground passed through in the levels above. Still we observe that the ends are at the present time worth 13 pennyweights 1 grain and 8 pennyweights 12 grains per ton, respectively. The 1,610 foot level going south has been driven a long distance in a reef varying from $2\frac{1}{2}$ feet to $3\frac{1}{2}$ feet wide and worth over 2 ounces to the ton. Some valuable ground has also been opened up on the east reef at Taylor's. On November 30, 1899, the superintendent reported that in the 1,510-foot level south the reef was $1\frac{1}{2}$ feet wide and worth over 3 ounces to the ton; a later report, however, shows that the richness has not been maintained. The second east reef at Wallroth has also developed a large extent of profitable ground, especially at the 1,060-foot level, where the assays have from time to time been exceedingly rich. According to a report dated December 15, 1899, in a winze sunk below the level the reef was 1 foot wide and worth something like 5 ounces to the ton. A new perpendicular shaft, known as Oakley's shaft, was commenced in January, 1899, and is now in course of sinking. The main object in sinking this shaft is to ventilate the mine and facilitate operations in the bottom levels between Taylor's and Wallroth's shafts. It is designed to cut the lode at a depth of 1,500 feet, and is now down about 250 feet. We do not expect that any diminution will be seen in the reserves of ore at Ooregum in spite of the fact that for several months in the early part of the year the native labor was depleted to the extent of about one-third. During the second half of the year, however, the labor conditions were normal and mining operations have been particularly successful.

Recent developments at Nundydroog are distinctly encouraging, and this, combined with the fact that the returns have shown a marked improvement during the last few months, seems to point to the probability of the mine soon recovering the ground which was lost when the disastrous flood occurred. A considerable amount of driving and sinking has been done, and rich quartz has been encountered at several points in the mine. The sinking of Kennedy's shaft has recently been suspended, and levels north and south at a depth of 1,100 feet have been commenced. In a rise above the 700-foot level south, according to the last report, dated December 20, 1899, the lode was $1\frac{1}{2}$ feet wide and worth 2 ounces 4 pennyweights to the ton. North shaft had attained a depth of 1,117 feet, and the quartz at the bottom of the shaft was 1 foot wide, assaying 2 ounces to the ton. The 1,100-foot levels north and south, though now apparently in poor ground, have passed through some rich quartz, the lode in the north end at one time having been about 3 feet wide and worth $2\frac{1}{2}$ ounces, and in the south end 1 foot wide and worth nearly 3 ounces to the ton. At Main shaft, in a winze below the 1,240-foot level north, the lode was recently reported to be 6 feet wide (quartz) and assaying $1\frac{1}{4}$ ounces to the ton. A new level has been started at Trial shaft at a depth of 300 feet.

The year's work at Coromandel was very disappointing; but it is not an uncommon experience with mines on the Kolar gold field to encounter a poor zone after a fairly successful run. * * *

Here, also, a considerable quantity of valuable ground has been laid open at various points. In a winze below the 800-foot level to the north of Prospect shaft there is a reef 1 foot wide and worth 1 ounce to the ton. * * *

The reserves of ore on September 30, 1899, were estimated at 12,000 tons; but this does not include ore opened up on the Coromandel lode, of which there are many thousand tons believed to be of milling value.

Underground operations at Balaghat have been vigorously prosecuted. * * * The lodes that are being explored are of an extremely variable nature, both as regards size and value, but undoubtedly a large quantity of payable ground is being opened up at Taylor's shaft, Ogle's shaft, and Haines's shaft. An encouraging feature is the continuity of the ore shoot upon the main lode at Tennant's, and the recent discovery at the 800-foot level at Prospect shaft in the Coromandel mine has an important bearing upon the southern portion of the Balaghat property. * * *

The chief point of interest at present in the Tank Block property, owned by Mysore, West & Wynaad, is the northern extension of the east lode, which is being explored and developed by winzes sunk below the 550-foot level and by a series of crosscuts from Walker's south drive. At all points the lode is reported to be looking well, and though the value is extremely variable the average is good and should yield over 1 ounce to the ton if it keeps on as it is doing. * * *

At Nine Reefs during the past year Morrison's shaft has been sunk 151 feet and levels north and south driven at depths of 550 feet, 650 feet, and 750 feet. The result of this work has been to open up a considerable amount of payable stone. Recently a new shaft was started, which is designed to more readily develop the property. In sinking and rising from the 250-foot level 156 feet of development work has been done.

The principal operations conducted at Road Block have been the sinking of Nos. 1 and 2 shafts and the driving of levels north and south from each at depths of 200 feet, 300 feet, and 400 feet. The No. 1 shaft has been sunk during the year 179 feet and the No. 2 shaft 113 feet. In the course of the recent developments the assays have not been so favorable as we were led to hope at one time they would be. * * *

Mysore Reefs (Kangundy) reconstructed a few month ago, and at that time everything looked most promising, but a circular recently issued to the shareholders announced that the directors, owing to certain unfavorable reports that had been received, had ordered the suspension of operations.

Work still proceeds at the Oriental mine, but without any satisfactory results. Taylor's engine shaft has been sunk to a depth of 926 feet, and crosscuts have been driven west at 176 feet, 310 feet, and 900 feet. The 175-foot level north has been extended for a considerable distance on a portion of the lode, but unfortunately is of low grade. The lode has not yet been intersected in the 310-foot and 900-foot crosscuts, nor has the main part yet been cut in the shaft. The sinking of the latter was suspended for some time while the crosscuts above referred to were being driven, but the deepening of the shaft has lately been resumed in the anticipation of cutting the main part of the lode. Kempinkote has been a disappointment. * * *

A word as to the gold fields of Mysore. During the past year practically the whole of the prospecting work was suspended, and also operations on the south shaft (Golconda block). The management is now confining its attention to the West Balaghat mine, where there are promises of a fair measure of success. * * *

In a winze that is being sunk below the 375-foot level south, according to the last report, the lode was 2 feet wide, and worth over 1 ounce of gold to the ton. This is the deepest point in the mine. A rise is being put up in the back of the same level, where the lode is reported to be 18 inches wide and worth $12\frac{1}{2}$ pennyweights to the ton. Again, in the 217-foot level there is a "pay streak" 18 inches wide and worth 17 pennyweights per ton. * * * The shoot of ore that is now being sunk and driven upon in the 375-foot level south is evidently the same as that passed through at the 117-foot level, and which has now been encountered in the 217-foot level. * * *

The operations at Wondalli are proceeding satisfactorily, and a considerable amount of development work has been done during the past year—sinking and driving on the Lord Harris and the West shafts. The most promising developments at present are in the latter. In the course of driving the 500-foot and 600-foot levels the lode has been of a character that has been most tantalizing, varying in value from a few pennyweights up to 5 ounces to the ton.

Altogether, the Indian mines are doing uncommonly well, and there is every reason to look forward with confidence to another prosperous year. The recent decision to mint the Kolar gold at Bombay, instead of allowing it to be sent to London, will mean a saving of about £10,000 a year to the companies in freight and insurance.

BRITISH NORTH AMERICA.

The gold of British North America is derived from Canada and Newfoundland, the former including Nova Scotia, Ontario, Quebec, British Columbia, the Saskatchewan, and the Yukon.

Within the ten-year period preceding the rush to the Yukon (1887 to 1896, both inclusive) the average annual output of gold in Canada amounted to \$1,351,340, of which \$718,841 was produced in British Columbia and \$439,418 in Nova Scotia, leaving \$193,081, or about 14 per cent, to the rest of Canada. In 1897 the total yield was more than doubled, the increase being due, nearly all, to the Yukon and British Columbia.

In 1898 the product of the preceding year was again more than doubled, the increase coming almost exclusively from the Yukon. The latter and British Columbia furnished together 94 per cent of the total product of Canada. The same position was retained by them during 1899, their aggregate product amounting to 95 per cent of the total for Canada, which shows as substantial a growth as the year before. The increase over 1898 was \$7,485,000 (in round figures), as against \$7,748,000 in 1898 over the product of 1897.

There is no information available for the production of the precious metals in Newfoundland. The production of gold at Swansea, Wales, from Newfoundland ores was estimated by Mr. R. P. Rothwell, editor of the Mineral Industry, at 3,000 fine ounces Troy for 1896, and the same estimate has been reproduced by him from year to year ever since. This represents a value of \$62,015, at which the product of Newfoundland is taken by this Bureau.

The production of silver in Canada showed a very slow growth until 1895, when the yearly output was nearly doubled in value, reaching the sum of \$1,030,000 for the year. In 1896 the output was again more than doubled, the increase being \$1,119,000. The progress reached its high-water mark next year (1897), when the output rose to \$3,323,395, an increase of \$1,174,000 over the preceding year. Within the last two years, however, the production of silver has taken a backward course, the product of 1899 falling behind that for 1896. It was still nearly double the product of 1895, the year which marked the beginning of the upward course. Within all these years the growth of silver production was due exclusively to British Columbia, all other provinces furnishing from 1895 to 1897 about 2 per cent; in 1898, nearly 4 per cent, and in 1899, 14 per cent of the total for Canada. Within the year 1899 silver mining in Ontario showed signs of improvement, and a new silver field was found in the Yukon district.

The tables given below were compiled from the official reports of the geological survey of Canada and brought up to date by correspondence with the geological survey department, which follows:

GEOLOGICAL SURVEY OF CANADA,
Ottawa, September 19, 1900.

DEAR SIR: Replying to your letter of September 13 I have much pleasure in inclosing the figures for production of gold and silver in the Dominion of Canada for the calendar year 1899.

We have no figures here for Newfoundland, the government of which is a colony by itself and not under our purview; but the amount of gold and silver produced there, if any, must be small, and would be contained in pyritous ore shipped from that island. You might apply for information to Mr. J. P. Howley, director geological survey, St. Johns, Newfoundland.

Yours, truly,

GEORGE M. DAWSON, C. M. G., LL. D., F. R. S.

GEOLOGICAL SURVEY DEPARTMENT,
DIVISION OF MINERAL STATISTICS AND MINES.

The production of gold and silver in Canada, by provinces, was, in 1899, as follows:

PRODUCTION OF GOLD AND SILVER IN CANADA IN 1899.

Provinces.	Gold.		Silver.	
	Weight.	Value.	Weight.	Value.
	<i>Ounces.</i>		<i>Ounces.</i>	
Nova Scotia.....	29, 879	\$617, 604	.....	.....
Quebec	238	4, 916	40, 231	\$23, 970
Ontario	20, 340	420, 444	202, 000	120, 352
Northwest Territories:				
Saskatchewan River.....	726	15, 000	.....	.....
Yukon district	774, 069	16, 000, 000	230, 000	137, 034
British Columbia	203, 313	4, 202, 473	2, 939, 413	1, 751, 302
Total.....	1, 028, 565	21, 260, 437	3, 411, 644	2, 032, 658

Gold is expressed in ounces fine, and silver valued at 59.58 cents per ounce, New York commercial value.

According to information furnished to this Bureau by the geological survey department of Canada, under date of Ottawa, May 23, 1898, an ounce of fine gold was taken, for statistical purposes, at \$20.67. The rate adopted for the value of the fine gold product in the tables of this Bureau is \$20.671834625+. This accounts for the slight deviation in the total value of the gold product of Canada and Newfoundland, in the table of the world's production, from the figures reproduced here from Canadian sources.

The commercial value of an ounce of fine silver for 1899 has been accepted at \$0.60, which likewise explains the difference between the total value of the silver product of Canada, given above, and that appearing in the table of the world's production.

PRODUCTION OF GOLD IN CANADA SINCE 1886.

Year.	Nova Scotia.		Ontario.		Quebec.		Saskatchewan.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
	<i>Ounces.</i>		<i>Ounces.</i>		<i>Ounces.</i>		<i>Ounces.</i>	
1887	21, 212	\$413, 631	327	\$6, 760	.....	\$1, 604	102	\$2, 100
1888	27, 407	436, 939	.....	.....	.....	3, 740	58	1, 200
1889	26, 155	510, 029	.....	.....	.....	1, 207	968	20, 000
1890	24, 358	474, 990	.....	.....	.....	1, 350	194	4, 000
1891	23, 391	451, 503	97	2, 000	.....	1, 800	266	5, 500
1892	21, 080	389, 965	344	7, 118	.....	12, 987	508	10, 506
1893	14, 030	381, 095	708	14, 637	.....	15, 696	466	9, 640
1894	14, 980	389, 338	1, 917	39, 624	.....	29, 196	725	15, 000
1895	22, 113	453, 119	3, 015	62, 320	.....	1, 281	2, 419	50, 000
1896	25, 597	493, 568	5, 563	115, 000	.....	3, 000	2, 661	55, 000
1897	26, 964	562, 165	9, 158	189, 294	.....	43	900	50, 000
1898	26, 957	538, 590	12, 863	265, 889	295	6, 089	1, 209	25, 000
1899	29, 879	617, 604	20, 340	420, 444	238	4, 916	726	15, 000

PRODUCTION OF GOLD IN CANADA SINCE 1886—Continued.

Year.	Yukon.		British Columbia.		Total.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
	<i>Ounces.</i>		<i>Ounces.</i>		<i>Ounces.</i>	
1887	3,357	\$70,000	.....	\$693,709	57,465	\$1,187,804
1888	1,935	40,000	.....	616,731	53,150	1,098,610
1889	8,466	175,000	.....	588,923	62,658	1,295,159
1890	8,466	175,000	.....	494,476	55,625	1,149,776
1891	1,935	40,000	.....	429,811	45,022	930,614
1892	4,233	87,500	.....	399,526	43,909	907,601
1893	8,515	176,000	.....	379,535	47,247	976,603
1894	6,047	125,000	.....	530,530	54,605	1,128,688
1895	12,095	250,000	.....	1,266,964	100,806	2,083,674
1896	14,514	300,000	.....	1,788,206	133,274	2,754,774
1897	120,948	<i>a</i> 2,500,000	131,817	2,724,657	291,582	6,027,016
1898	483,893	<i>a</i> 10,000,000	142,218	2,939,852	666,445	13,775,420
1899	774,069	<i>a</i> 16,000,000	203,313	4,202,473	1,028,565	21,260,437

a Estimated officially.

The Yukon figures are officially stated to be approximations only.

The value of the gold has been obtained as nearly as possible, and from this the number of fine ounces has been calculated.

SILVER, ANNUAL PRODUCTION.

Calendar year.	Ontario.		Quebec.		British Columbia.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
	<i>Ounces.</i>		<i>Ounces.</i>		<i>Ounces.</i>	
1887	190,495	\$186,304	146,898	\$143,666	17,690	\$17,301
1888	208,064	195,580	149,388	140,425	79,780	74,993
1889	181,609	169,986	148,517	139,012	53,192	49,787
1890	158,715	166,016	171,545	179,436	70,427	73,666
1891	225,633	222,926	185,584	183,357	3,306	3,266
1892	41,581	36,425	191,910	168,113	77,160	67,592
1893 .....	.....	8,689	.....	126,439	.....	195,000
1894 .....	.....	.....	101,318	63,830	746,379	470,219
1895 .....	.....	.....	81,753	53,369	1,496,522	976,930
1896 .....	.....	.....	70,000	46,942	3,135,343	2,102,561
1897	5,000	2,990	80,475	48,116	5,472,971	3,272,289
1898	85,000	49,521	74,932	43,655	4,292,401	2,500,753
1899	202,000	120,352	40,231	23,970	2,939,413	1,751,302

Calendar year.	Yukon.		Total.	
	Quantity.	Value.	Quantity.	Value.
	<i>Ounces.</i>		<i>Ounces.</i>	
1887			355,083	\$347,271
1888			437,232	410,998
1889			383,318	358,785
1890			400,687	419,118
1891			414,523	409,549
1892			310,651	272,130
1893				330,128
1894			847,697	534,049
1895			1,578,275	1,030,299
1896			3,205,343	2,149,503
1897			5,558,446	3,323,395
1898			4,452,333	2,593,929
1899	230,000	\$137,034	3,411,644	2,032,658

BRITISH COLUMBIA.

The following table shows the yield of placer gold in British Columbia since 1858:

YIELD OF PLACER GOLD PER YEAR TO DATE.

Year.	Value.	Year.	Value.
1858	\$705,000	1880	\$1,013,827
1859	1,615,070	1881	1,046,737
1860	2,228,543	1882	954,085
1861	2,666,118	1883	794,252
1862	2,656,903	1884	736,165
1863	3,913,563	1885	713,738
1864	3,735,850	1886	903,651
1865	3,491,205	1887	693,709
1866	2,662,106	1888	616,731
1867	2,480,868	1889	588,923
1868	3,372,972	1890	490,435
1869	1,774,978	1891	429,811
1870	1,336,956	1892	399,526
1871	1,799,440	1893	356,131
1872	1,610,972	1894	405,516
1873	1,305,749	1895	481,683
1874	1,844,618	1896	544,026
1875	2,474,004	1897	513,520
1876	1,786,648	1898	643,346
1877	1,608,182	1899	1,344,900
1878	1,275,204		
1879	1,290,058	Total	61,305,719

The gold and silver production of the lode mines since 1887 is shown below:

PRODUCTION OF LODE MINES.

Year.	Gold.		Silver.	
	Ounces.	Value.	Ounces.	Value.
1887			17,690	\$17,331
1888			79,780	75,000
1889			53,192	47,873
1890			70,427	73,948
1891			4,500	4,000
1892			77,160	66,935
1893	1,170	\$23,404	227,000	195,000
1894	6,252	125,014	746,379	470,219
1895	39,264	785,271	1,496,522	977,229
1896	62,259	1,244,180	3,135,343	2,100,689
1897	106,141	2,122,820	5,472,971	3,272,836
1898	110,061	2,201,217	4,292,401	2,375,841
1899	138,315	2,857,573	2,939,413	1,663,708
Total	463,462	9,359,479	18,612,778	11,340,609

MINING LAWS IN THE ATLIN DISTRICT.

Newport, R. I., September 19, 1899.

SIR: With reference to your note of April 3, last, transmitting a petition to the President of the United States by American citizens resident in the Atlin district of British Columbia, engaged in mining, I have the honor to inform you that the complaint has been under the consideration of the Canadian Government.

I inclose herewith, for your information, a copy of an approved minute of the Canadian privy council, submitting a communication from the lieutenant-governor of British Columbia, in which complaints as set forth in the above-mentioned petition are fully dealt with.

I have the honor to be, with the highest consideration, sir,

Your most obedient, humble servant,

REGINALD TOWER.

The Hon. JOHN HAY, etc.

[Extract from a report of the committee of the honorable the privy council, approved by His Excellency on the 16th August, 1899.]

The committee of the privy council have had under consideration a dispatch, hereto attached, dated 7th April, 1899, from Her Majesty's ambassador to the United States, transmitting a communication from the Secretary of State for the United States, inclosing a petition to the President of the United States from a number of its citizens, resident in the Atlin district of British Columbia, engaged in mining, representing that having taken out free miners' certificates under the laws of British Columbia, they proceeded to locate placer claims in the Atlin district, but before they were able to record their claims an act was passed by the legislature of British Columbia entitled "An act to amend the placer mining act," the effect of which, it is alleged, was to deprive the petitioners of the proprietary rights to any placer mines which, though staked, had not been recorded prior to the passing of the act.

The Secretary of State, to whom the matter was referred, observes that the dispatch from the British ambassador with the inclosures from the Secretary of State at Washington, including a copy of the petition, was sent to the lieutenant-governor of British Columbia, requesting him to obtain from his ministers an expression of their views on the complaints of the petitioners. An answer has now been received, which in effect declares that the statements in the petition are very much exaggerated; that under the mining laws of the province no right can be acquired until the claim has been recorded and that all recorded claims are exempted from the operation of the act referred to.

The government of British Columbia recognizing, however, that possibly, through lack of sufficient facilities for recording claims, there may have been some instances where locatees were unable within a reasonable time to record their claims, introduced an amending act in the same session, which was adopted, authorizing the appointment of a judge of the supreme court as a commissioner with full power to settle all disputes in that district in accordance with equity and the spirit of the mining acts without being bound by the strict letter of the law. As the report of the judge has not yet been made public, it is impossible to say how wide a discretion he has exercised in considering claims of American miners actually located but not recorded prior to the 18th January, 1899, the date of the passing of the act amending the placer mining act; if, however, any reliance can be placed on newspaper reports, it would appear from the extracts hereto attached, taken from the Victoria Daily Times of the 12th and 17th of July, 1899, that the judge was disposed to be influenced in his decisions by the equities of the case rather than by the strict letter of the statute.

The public lands in British Columbia belong to the province, and the policy of granting or of withholding licenses to aliens is under the exclusive control of its legislature, and it would be contrary to the spirit of the constitution to interfere with a provincial act dealing with the disposition of its public lands.

For the past thirty years the mining laws of British Columbia have been of the most liberal character, and citizens of the United States have derived larger profits from the mines of that province than any other nationality.

It is no exaggeration to say that over 75 per cent of the mineral wealth of the Kootenay district, in southern British Columbia, has gone to enrich American citizens, and the first restrictive legislation introduced is the act referred to relating to placer mines, and which seems to have been suggested by section 2319 of the mineral lands act of the United States.

The contrast heretofore between the mining laws existing on the north side of the forty-ninth parallel and the laws to the same subject that prevail on the south side of that parallel of latitude has been so marked as to frequently evoke strong comments. Section 2319 of the Revised Statutes of the United States relating to mineral lands reads as follows:

"All valuable mineral deposits in lands belonging to the United States, both surveyed and unsurveyed, are hereby declared to be free and open to exploration and purchase, and the lands in which they are found to occupation and purchase by citizens of the United States and those who have declared their intentions to become such, under regulations prescribed by law, and according to the local customs or rules of miners in the several mining districts, so far as the same are applicable and not inconsistent with the laws of the United States."

The clause on the same subject in the British Columbia act referred to grants the rights and privileges of a British subject in taking up placer mining claims also "to those who have declared their intention to become such." The similarity in the language of the two sections is noticeable.

The public lands in the Northwest and Yukon territories belong to Federal authority and American citizens have availed themselves of the liberal laws of the Dominion to acquire mineral lands and mining rights in the Yukon in a greater proportion than

any other nationality, and the reports of the gold dust now arriving at Seattle and other American ports confirm the impression that the citizens of the United States are receiving a larger share of the wealth of the Yukon than even Canadians.

It is no doubt true that by section 13 of Cap. 299, approved on the 14th May, 1898, which reads as follows:

“SECTION 13. That native-born citizens of the Dominion of Canada shall be accorded in said district of Alaska the same mining rights and privileges accorded to citizens of the United States in British Columbia and the Northwest Territory by the laws of the Dominion of Canada or the local laws, rules, and regulations; but no greater rights shall be thus accorded than citizens of the United States or persons who have declared their intention to become such, may enjoy in said district of Alaska; and the Secretary of the Interior shall from time to time promulgate and enforce rules and regulations to carry this provision into effect.”

Congress evinced a desire to extend to native-born Canadians mining rights in Alaska similar to those enjoyed by American citizens in the Yukon territory, but as the system in Canada is to grant mining licenses and the practice in the United States is to grant the land in fee, and as the dimensions of mining claims in the one country are not equal to the area in the other country, the officials in Alaska have taken advantage of the technical difference between the mining laws in Alaska and the British Yukon to nullify section 13 referred to, the contention of American officials being that the Canadian law relating to the acquisition of mining rights must first conform to the American statutes before native-born Canadians can take up mining claims in Alaska.

The discrimination against British subjects on one side of the international boundary compared with the absence of any discrimination against American citizens on the other side of the line has no doubt had its effects on public opinion in British Columbia, and has resulted in the passing of the act to which objection is now taken.

The minister further observes that a like sentiment is growing in other parts of the Dominion, and it will be a cause for great regret if that feeling becomes so general as to force the parliament of Canada to adopt mining laws similar in their discriminating character to those that have been passed by Congress at Washington.

The committee advise that your excellency be moved to transmit a certified copy of this minute and of the report of the government of British Columbia to Her Majesty's embassy at Washington for communication to the honorable the Secretary of State at Washington.

All of which is respectfully submitted for your excellency's approval.

JOHN J. McFEE,
Clerk of the Privy Council.

GOVERNMENT HOUSE,
Victoria, B. C., June 8, 1899.

SIR: Adverting to your letter of the 5th ultimo, wherewith you forwarded copy of a petition to the President of the United States from certain residents of Atlin, complaining of recent mining legislation of this province, I have the honor to transmit herewith a certified copy of an approved minute of my executive council, dated yesterday, embodying the views of my government in respect to the alleged grievances of the petitioners and as to the scope of the said legislation.

I have the honor to be, sir, your obedient servant,

THOS. R. MCGINNIS, *Lieutenant-Governor.*

THE SECRETARY OF STATE,
Ottawa, Canada.

[Copy of a report of a committee of the honorable executive council, approved by his honor the lieutenant-governor on the 7th day of June, 1899.]

The committee of council concur in the report inclosed herewith and advise that a copy of the same, if approved, be forwarded to the honorable the secretary of state, for the information of his excellency the Governor-General in council.

A. CAMPBELL REDDIE,
Deputy Clerk Executive Council.

THE LIEUTENANT-GOVERNOR IN COUNCIL:

The undersigned has had before him for consideration a communication from the lieutenant-governor dated the 12th ultimo, wherewith is transmitted a copy of a

petition addressed to the President of the United States by certain residents of Atlin, complaining of recent mining legislation of this province, as therein set forth.

The undersigned has the honor to report as follows in regard to said petition.

The petition states that four-fifths of the claims prospected and located belong to citizens of the United States, thus, according to the petition itself, there is only one-fifth left for other aliens and our own citizens. This statement is probably like the other statements in the petition—greatly exaggerated—but there is sufficient truth in it to justify (if this proportion between aliens and citizens should be maintained) the stand which the legislature took to carry out their avowed policy, the reservation of the provincial placer mines for British subjects.

The question whether such policy was in the true interest of the Province is one for the legislature and the legislature alone, and the unanimity with which that body indorsed this policy is sufficient to show that the Government and the legislature were in complete accord in the matter. There is no attempt to discriminate between the native born and the naturalized citizen, nor to throw any difficulty whatever in the way of an alien desiring to become naturalized. All that is done is to say our placer mines are reserved for those who are prepared to acknowledge their obligations as citizens of the British Empire.

Taking up the complaints in the petition seriatim, we would say, any right acquired by the petitioners have been preserved to them. The legislation complained of specifically exempts all claims recorded prior to its passage and provides for the unimpeded working of such claims by the holders, although aliens. A reference to the mining laws will show that their whole tenor is, as it necessarily must be, that no right is acquired until a claim is recorded. As already stated all such rights are scrupulously respected. It may be well to note this, as a casual reader of the petition unacquainted with the facts might naturally suppose that such claims had been confiscated.

The Government with the sanction of the legislature had an unquestioned right to reserve any lands they might think fit from the prospector and miner. They might have said the Crown retains in its own possession for the present all mines and minerals the property of the Crown in the northern part of the Province, and no one will be allowed to prospect for or appropriate minerals in that section. Such a course might have been taken with a view of working these claims by the Crown for its own direct benefit, or with the purpose of having these claims in reserve after the mining interests in the other parts of the Province had been more fully developed.

Suppose such a course had been adopted that all the miners had been excluded from the lands in question, the absurdity of the petitioner's claims would be seen at once, and the absurdity exists no less although the reserve thus made has been relaxed so far as citizens are concerned. The grievance of the petitioners is really not that they are shut out but that others are admitted.

The fifth clause of the petition claims that the petitioners had acquired vested rights by taking out free miners' certificates, not only to the rights granted by such certificates at the time, but to renewal in perpetuity of such rights. To state this is to refute it. The Crown and the legislature in providing for the granting to free miners the right to prospect for and appropriate minerals did not and could not divest themselves of the power to amend the terms and conditions of such certificates in any manner that might be deemed expedient. When recorded claims were exempted from the operation of the law everything, as already stated, had been done that the most extreme advocate of vested rights could justly claim.

The sixth clause of the petition complains of alleged losses to the petitioners through lack of sufficient facilities for recording claims. This to some extent may have been the case, but so far as it did exist was caused by unavoidable circumstances for which no responsibility attaches to the Government.

So anxious have the Government and the legislature been to minimize as much as possible any hardship or injustice which may have been occasioned through the sudden rush into the northern country following on the discovery of rich diggings there that an act was passed at the last session of the legislature providing for the appointment of a judge of the supreme court as a commissioner with full powers to settle all disputes in that country in accordance with equity and the spirit of the mining acts without being bound by the strict letter of the law.

The grievance complained of in the seventh clause of the petition, that aliens can not obtain work on claims held by citizens, has already been removed. By the legislation of last session the necessity of a laborer in a mine taking out a free miner's certificate is done away with.

The eighth clause of the petition alleges great injury to the interests of the country through the action of the law complained of. This, however, is purely a matter for

the legislature to judge of and is of no concern to outsiders. The Government do not consider the statement is true nor that any present depreciation, even if such exists, is likely to be lasting.

The ninth clause of the petition alleges damages to citizens of the United States to the extent of many millions. This is only necessary to allude to as a good instance of the absurd misstatements and exaggerations of the whole of the document. As already repeatedly stated, the petitioners had acquired no rights which are in any way affected by the legislation complained of.

Dated this 6th day of June, A. D. 1899.

C. A. SEMLIN,
Provincial Secretary.

WASHINGTON, June 25, 1900.

SIR: With reference to Mr. Tower's note of the 19th September last on the subject of the British Columbian mining laws I have the honor, in obedience to instructions received from Her Majesty's principal secretary of state for foreign affairs to inform you that the governor-general of Canada has reported that his ministers have disallowed the "Act to amend the placer mining act," passed by the legislature of British Columbia.

I have the honor to be, with the highest consideration, sir,
Your most obedient, humble servant,

PAUNCEFOTE.

Hon. JOHN HAY, etc.

GOLD.

[From the Annual Report of the Minister of Mines, British Columbia, 1899, p. 556.]

The gold production for the year 1899—including both placer and lode gold—amounts to the large sum of \$4,202,473, thoroughly substantiating the claim of British Columbia to the title of the Golden Province.

Never before in the history of the Province has the gold production reached the four-million mark. The nearest approach thereto was in 1863, when the production was \$3,913,563, and this year consequently leads any previous year by \$288,910.

Placer gold.—The yield of placer gold was \$1,344,900, an amount not equaled within the last twelve years. This increase is due to the Atlin district, which this year first enters the lists as a serious producer, and despite the disadvantage of a late first season and innumerable disputes as to the ownership of claims has yielded about \$800,000 in gold.

Placer mining in other parts of the Province has, on the whole, not been very successful this past year, largely owing to an excessively wet season, which kept the rivers so constantly in flood that but few of them could be worked by the usual placer methods.

Gold obtained by hydraulicking has been included under placer gold, and forms the chief part of the product of the Cariboo district.

Dredging for gold has not as yet become a factor in the yield.

Many companies are at work building and experimenting with different classes of dredges and machinery, but the problem of saving the fine flake gold, which unquestionably exists in the bed of the Fraser and other rivers, is a complicated one and requires time to solve.

Lode gold.—The output of gold obtained from lode mining was \$2,857,573, an increase over last year of some \$656,356. This increase is due chiefly to the greatly increased tonnage of the Rossland camp and the operations of the Ymir mines in the Nelson mining division.

Lillooet mining division this year has also contributed some \$27,000 worth of gold, the product of stamp mills, whereas in the Osoyoos district there has been a decrease of about 30 per cent from the previous year's production, which is accounted for by the fact that most of the producing mines confined themselves largely to development work, in anticipation of the railway facilities expected in the near future, and the consequent cheapening of freights and supplies.

The production of gold from lode mining has been obtained approximately as follows:

From direct smelting	\$2, 166, 000
From combined amalgamation and concentrating	600, 000
From cyanide process	91, 000
Total	2, 857, 000

SILVER LEAD.

[From the Annual Report of the Minister of Mines, British Columbia, 1899, p. 557.]

While it is a pleasure to note the material increase in other quarters, it is with regret that I have to report so poor a showing from our silver-lead producers, chiefly of the Slocan. If taken as they stand, the statistical figures in themselves are not encouraging as to the growth of the industry, so I feel obliged to offer an explanation of our poor showing in this quarter.

The fact is that many of our largest producers in the Slocan have been shut down, either partially or entirely, for the greater part of the producing year—i. e., since June or July—owing to a question between the owners of the mines and their workmen.

The list of producing mines in the Slocan has altered very little since last year, a few new names only appearing on the list; but the total yearly tonnage of the district has dropped from 30,691 tons in 1898 to 21,507 tons in 1899, according to the returns of ore treated or shipped. The tonnage of ore actually mined in 1899 would be somewhat less, as some of the mines having concentrators utilized the period of enforced idleness underground in running through their mills dumps of second-grade ore which had accumulated, which has helped to swell the tonnage of ore shipped, and accounts for the greater proportionate decrease in the silver and lead contents of the ore, there having been no appreciable decrease in the assay value of the ores mined. This decrease in production is in no way attributable to any failure or depreciation in the mines themselves, but solely to the fact that they have been worked only a portion of the year.

The total silver production for the year amounts to 2,939,413 ounces, valued at \$1,663,708, a decrease from the production in 1898 of 1,357,619 ounces fine silver, and of \$712,133.

The total lead production for 1899 amounts to 21,862,436 pounds, valued at \$878,870, as against 31,693,559 pounds, valued at \$1,077,581, for 1898, a decrease of 9,831,123 pounds of lead and of \$198,711 in value.

THE ATLIN GOLD FIELDS OF BRITISH COLUMBIA.

[From the Mining and Scientific Press, San Francisco, May 19, 1900. Written by J. H. Brownlee, provincial land surveyor.]

The Atlin mining district is situated in the northwest corner, so to speak, of the Province of British Columbia, and is approached from Skagway, Alaska, the latter being in touch with all the cities of the Pacific coast. From Skagway to Atlin the journey is an easy one; first, for 50 miles over the narrow-gauge railway of the Yukon and White Pass Company to Bennett, a small town at the southern extremity of Bennett Lake, thence easterly another 70 or 80 miles by lake steamers to Atlin town, which nestles in a snug harbor on the east shore of Atlin Lake.

At present continuity of navigation to Atlin is broken for a distance of 2 miles. This is between Atlin Lake and Taku Arm, and the portage is equipped with a tramway having wharves at both ends. During the season of navigation, say from May until November, the trip between Atlin and Skagway is made in one day. In winter it takes at most two days over the ice from Log Cabin, a station on the Yukon and White Pass Railway to Atlin.

The Atlin mining district extends from the Dalton trail, west of the Chilkat River, easterly through about 4 degrees of longitude, or a width of about 140 miles, to the watershed between Surprise and Gladys lakes. The northern boundary is the recently demarcated sixtieth parallel of north latitude. The southern limit is that much-disputed irregular line between the United States and Canada. Within this extensive range of country there is in the aggregate a large area of lakes whose waters drain indirectly into the Yukon River, and which afford an easy means of getting about the country. The principal lakes of the district are Atlin, Bennett, and Taku Arm. These are long, narrow stretches of water lying over 2,000 feet above sea level, and in a direction north and south, being parallel to each other.

It may be said that the Atlin placer diggings were discovered in the summer of 1898, although it had been known for years to old Cassiar miners that a few big lakes, of which the largest was called Atlin, lay in the northwestern part of the Cassiar district "amidst rugged hills and massive glaciers."

The first "claim" in the new El Dorado was staked by Fritz Miller and Kenneth MacLaren, hailing from Juneau, Alaska. Miller is a German and MacLaren a Canadian. These hardy and intelligent prospectors were guided by the crude sketch and description of a third partner at Juneau.

Branching off the main trail somewhere near Bennett, these two men traveled on the ice and across country to Atlin Lake, and after much wandering and some hard-

ships found satisfactory diggings on Pine Creek and staked Discovery, where Pine City now stands, about 6 miles from the mouth of the creek. The news of the Miller-MacLaren strike soon got out and a few good, more bad, and many indifferent placer miners followed last year, with varying fortune, as is usual in all new mining camps.

The discoverers of Pine Creek have been rewarded by taking out upwards of \$40,000 from the creek bed alone in a length of about 800 feet. The benches are still unworked.

The winter climate of this country is not more severe than Dakota or Manitoba, if it is as cold.

THE YUKON DISTRICT.

The following is a condensed summary of the preliminary report on the Klondike gold fields, Yukon district, by Mr. R. G. McConnell, prepared for inclusion in the Annual Summary Report of the Geological Survey Department.

Mr. G. M. Dawson, C. M. G., director of the Geological Survey of Canada, in an introductory notice states that this report "is based almost entirely on field work carried out by him in the summer of 1899, during which his whole time was devoted to an examination of the Klondike region," and "may be regarded as the first result of a systematic and moderately detailed scientific examination of the district."

THE KLONDIKE GOLD FIELDS.

Prospectors have been at work in the Yukon region since about 1878, but mining can scarcely be said to have begun till some years later, and then, at first, only on a very small scale. River-bar mining began on the Lewes and Salmon in 1881 and 1882, on the Stewart in 1882 or 1883. This was followed by the discovery of (coarse) gold on Forty-mile River in the autumn of 1886. The tributaries of this stream yielded the next discoveries, and the producing field was gradually extended across the watershed to streams flowing into Sixty-mile River. In 1896 the Klondike discovery was announced, and the extreme richness of the new field speedily attracted, in 1897 and 1898, a host of adventurers from all parts of the world. The route followed by the majority was by steamer from Vancouver, Victoria, and United States coast towns farther south to Skagway or Dyea, across the Coast Range by the Chilkoot or White passes, to the head of the Lewes, and down the latter stream and the Yukon, in canoes or boats, to Dawson, at the mouth of the Klondike River. This route, which entailed considerable hardship and some danger, is still followed, but under very different conditions. The pack trail of the pioneer across the White Pass has been replaced by a well-built and equipped railway, and the canoes and small boats on the rivers have given way to a fleet of steamers. The journey from Vancouver to Dawson can now be made in comfort in about a week, and is well worth taking as a pleasure trip alone. A telegraph line has been built by the Canadian Government from Skagway to Dawson, and although this remains at present separated from the telegraphic system of the world, work is already in progress by which it will soon be connected with this system at Quesnel, in British Columbia.

The discoveries above briefly alluded to brought about rapid changes of various kinds besides those relating to means of communication.

Previous to the discovery of (coarse) gold on Forty-mile River the center of such limited trade as existed in the country was at the mouth of the Stewart River. In 1887 this was removed to the vicinity of Forty-mile River, and this continued to be the chief place until the Klondike discoveries occurred in 1896, when the town of Dawson was established on the bank of the Yukon, just below the confluence of the Klondike River. This rapidly became and has since remained the chief commercial center.

When a small force of the Northwest Mounted Police was first sent into the Yukon district in 1895, in the interests of law and order, it was quartered near Forty-mile River. Later on this force increased, and the circumstances led to the removal of most of the men to Dawson.

This place has since become the seat of government for the entire Yukon district. A local administration, with courts of justice and other organizations necessary for the government of the Yukon district, have been established, and the city is now not unprovided with most of the requirements of a civilized and progressive community.

The Klondike gold fields are situated east of the Yukon River in latitude 64° north. They are bounded in a general way by the Yukon River on the west, by the Klondike River on the north, by Flat Creek, a tributary of the Klondike, and Dominion Creek, a tributary of Indian River, on the east, and by Indian River on the south. The area included between these boundaries measures about 800 square miles.

The streams flowing through the area described are all gold-bearing to some extent, but only a limited number have proved remunerative.

The most important gold-bearing streams are Bonanza Creek, with its famous tributary, Eldorado Creek, Bear Creek, and Hunker Creek, flowing into the Klondike, and Quartz Creek and Dominion Creek, with Gold Run and Sulphur Creek, two tributaries of the latter, flowing into Indian River. A good deal of prospecting has been done outside the area described, but with the exception of a few claims on Eureka Creek, a tributary of the Indian River from the south, no pay gravels have so far been discovered, although good prospects are reported from many places.

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The streams are small, seldom exceeding 15 feet in width, even at their mouths, and along the productive portions of the valleys are much less.

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The Klondike River is a large rapid stream, averaging about 150 feet in width. It is interrupted by frequent bars, and has a fall of from 12 to 15 feet to the mile. Indian River, which forms the southern boundary of the district, is a much smaller stream. It has a width of from 20 to 40 yards, but is very shallow, the water on the bars seldom exceeding a few inches in depth. The channel is filled for long stretches below Quartz Creek with large, angular-boulders, and the navigation of the stream, even with small, lightly loaded boats, is very difficult.

The forest trees consist of the white and black spruces, the aspen and balsam poplars, and a species of birch.

* * * * *

The white spruce is the most important tree for general purposes in the district. It is usually small on the ridges, seldom exceeding a foot in diameter, but in the valley flats occasional specimens attain a diameter of over 2 feet, and a large proportion of the logs cut for lumber measure from 9 to 15 inches across. The supply for the mills at Dawson is obtained mostly from the flats and islands along the Upper Yukon and from the Klondike Valley, and is ample for all purposes for many years to come. The Klondike is bordered at intervals all the way from its mouth to the mountains by groves and small tracts of spruce forest of surprising size and quality, considering the latitude, and supplies of well-grown spruce timber are also available from all the larger tributaries of the Upper Yukon as well as from the main valley, and can be easily and cheaply floated down to Dawson.

The supply of large timber on the producing creeks themselves is limited, but the bordering ridges are nearly everywhere, except on the higher points, clothed with an open forest of small spruce, birch, and poplar, ranging from a few inches to a foot or more in diameter.

GRAVELS.

The gravels of the district are of four different kinds, as follows, beginning with the latest: Stream gravels (present), terrace gravels, river gravels, and old valley gravels (quartz drift and yellow gravels).

GOLD IN GRAVELS.

Gold in paying quantities occurs in the stream gravels, the terrace gravels, and in the quartz drift, but so far has not been found in the old valley gravels overlying the quartz drift or in the gravels here designated as river gravels.

Gold is found in the stream gravels everywhere, but in productive quantities only along portions of the valleys. The richest stretches usually occur about midway in the length of the streams. The distribution is, however, irregular, and no fixed rule can be formulated in regard to it. The total length of the paying portions of the different creeks, including some intervening barren parts, aggregates about 50 miles. It is impossible to give even an approximate estimate of the value of this great stretch of paying gravels, owing to the irregularity of the concentration and the difficulty in obtaining trustworthy returns from most of the mines. It may be stated, however, that the product of a few of the 500-foot claims on Eldorado and Bonanza creeks will exceed a million dollars each, while a considerable number on the same two creeks (in fact the majority of the lower Eldorado claims and a few on Hunker Creek) will

yield over half a million each, and claims running from a quarter to half a million are common on all these creeks and also on Dominion and Sulphur creeks. Assuming a quarter of a million as the average, and that three-quarters of the claims in the distance given above are rich enough to work, the total value approaches \$95,000,000, a figure which is well within the mark. In this rough estimate no account has been taken of long stretches of gravel on all the creeks that is too low in grade to work at present, but will eventually become payable with improved conditions and cheaper methods of working; nor does it include probable further discoveries along the numerous gulches and small streams of the district, few of which have so far been carefully prospected.

The terrace gravels on Eldorado, Bonanza, Hunker, and Dominion creeks include a few rich claims and a large number that pay fairly well, but statistics of production are entirely wanting.

The extensive deposits of quartz drift along Bonanza, Hunker, Eldorado, and Quartz creeks almost rival in importance the creek gravels themselves. They are everywhere more or less auriferous, and are very rich over wide stretches. They suffer, however, from the scarcity of water on the hillsides; and the ruinous methods the miners are forced to adopt, when operating on a small scale, prevent any but rich claims from being worked.

METHODS OF WORKING.

Creek claims are worked either by sinking and drifting or by open cuts. The former method was the one first employed and is still very generally used, as operations can thus be carried on during the winter.

The ground is frozen everywhere, and, except where the muck is free from sand or gravel and can be picked out, thawing is always necessary.

This is done either by wood fires, heating the water at the bottom of the shafts with hot stones, or by steam thawers. The latter method is gradually superseding the two former, and is a very simple one. A small boiler is generally used, from which the steam is passed through rubber hose, to the ends of which pointed steel tubes about 4 feet in length are affixed. The latter are driven into the frozen gravel, and steam is forced through them for six or eight hours. They are then withdrawn and the thawed material removed. The points require steam equal to about 1-horsepower each, and thaw from 1 to 3 cubic yards of gravel at a shift. The introduction of the steam thawer is of recent date, and marks a great advance in the mining methods of the district. It thaws more rapidly than wood fires, requires at least a third less wood to do the same work, and can be used in summer as well as in winter. It has also the further great advantage over wood fires of purifying the air in place of fouling it.

The material drifted out from around the foot of the shaft is piled up in dumps, when the work is done in winter, and washed during the spring floods. In summer work the two operations of drifting and washing the excavated pay gravels are carried on at the same time if water can be obtained.

Timbering is seldom required in summer and never in winter, as the bed of frozen muck that overlies the gravel forms an extremely tenacious roof, and chambers of astonishing size can be excavated beneath it in winter without danger. In one case on Dominion Creek a muck roof, unsupported by pillars, covered a vault said to measure 140 feet by 230 feet, which remained unbroken until midsummer. It then sank slowly down in one block, until it rested on some piles of waste material which had been heaped up to prevent accidents in case of a collapse. Examples of muck roofs spanning vaults over a hundred feet in width are common on all the principal creeks.

In working claims by the second method, that of open cuts, the first object is to get rid of the muck covering. This is easily done in early spring by taking advantage of the spring floods and leading the water by several channels across the claim. The muck thaws readily, the streams soon cut down to the gravel, and the channels then gradually widen until they meet. In some cases the process is hastened by blowing the walls of the channel down into the stream with powder. When the muck covering is removed the gravels soon thaw to bedrock. The upper portion, if barren, is then removed, usually by hand, and the underlying pay gravel is sluiced in the ordinary way.

The open-cut method of working claims leads to a more complete extraction of the gold, and is the one generally preferred whenever the muck covering does not exceed 10 or 15 feet in thickness, a condition which obtains along the greater part of the principal producing creeks, with the exception of Sulphur Creek.

The terrace gravels are usually comparatively thin, and where uncovered by muck are worked by open cuts; where covered, by drifts.

The pay gravels in a few cases are sluiced in the valley bottom, but as a rule are washed in rockers.

The quartz drifts, like the terrace gravels, suffer from the scarcity of water, and rockers are employed for washing the pay gravel at nearly all the working claims. A few of the principal mines have gravity trans; and when arrangements can be made with the owners of the creek claims, the creek water is used for sluicing purposes. The extent and richness of this great deposit appear to fully warrant capital in undertaking the construction of some comprehensive scheme for delivering water along the principal hills, and until this is done the greater part of the deposit must remain unworked.

Machinery.—The employment of machinery in the working of Klondike claims is gradually increasing, but is still insignificant, a fact due largely to the absence of roads and the consequent impossibility of transporting heavy pieces up the creeks. Steam thawers are largely used and steam pumps are gradually replacing hand pumps, Chinese pumps, and water wheels for draining the pits. Steam hoists are employed at a few of the mines, but are not in general use. The greater part of the work of the camp is still done by hand, and this, notwithstanding the fact that, taking into consideration the high price of labor, nowhere in the world could machinery be more profitably employed."

PRODUCTION OF DISTRICT.

The gold production of the district can only be given approximately, but the following figures are probably nearly correct:

1897	\$2, 500, 000
1898	10, 000, 000
1899	16, 000, 000
Total	28, 500, 000

NOVA SCOTIA.

The following table showing the gold product of Nova Scotia is taken from the Report of the Department of Mines for 1898 (p. 74). The figures for 1897 are corrected according to the data furnished to this Bureau by the geological survey department of Canada, and the figures for 1899 are taken from the same source:

TABLE SHOWING THE GOLD PRODUCT OF NOVA SCOTIA, 1862-1899.

Year.	Gold extracted.	Year.	Gold extracted.
	<i>Ozs. dwt. gr.</i>		<i>Ozs. dwt. gr.</i>
1862	7, 275 0 0	1882.....	14, 107 3 20
1863	14, 001 14 17	1883.....	15, 446 9 23
1864	20, 022 18 13	1884.....	16, 059 18 17
1865	25, 454 4 8	1885.....	22, 202 12 20
1866	25, 201 13 2	1886.....	23, 362 5 13
1867	27, 314 11 11	1887.....	21, 211 17 18
1868	20, 541 6 10	1888.....	22, 407 3 10
1869	17, 868 0 19	1889.....	26, 155 6 13
1870	19, 866 5 5	1890.....	24, 358 9 9
1871	19, 227 7 4	1891.....	23, 391 0 0
1872	13, 094 17 6	1892.....	21, 080 3 18
1873	11, 852 7 19	1893 <i>a</i>	14, 030 5 7
1874	9, 140 13 9	1894.....	14, 980 7 13
1875	11, 208 14 19	1895.....	22, 112 17 21
1876	12, 038 13 18	1896.....	25, 596 14 6
1877	16, 882 6 1	1897.....	26, 963 14 2
1878	12, 577 1 22	1898.....	31, 104 17 0
1879	13, 801 8 10	1899.....	29, 879 0 0
1880	13, 234 0 4		
1881	10, 756 13 2	Total	715, 813 6 1

a Nine months only.

NOVA SCOTIA GOLD FIELDS.

[From Ores of Nova Scotia, by E. Gilpin, jr., inspector of mines, Halifax, Nova Scotia, 1898.]

The gold fields of Nova Scotia became known about the year 1860.

The earliest discovery was followed by numerous others, until it was at first believed that it was all auriferous. Gradually, however, it became evident that the workable deposits of free gold were confined to the Atlantic half of the Province. Investigation showed that this district was occupied by two divisions of rock, granite and slates and quartzites or sandstones, compacted by a siliceous cement and locally known as "whin." Geologists referred the latter to the Lower Cambrian age, a series of rocks known to be auriferous in other parts of the world.

In Nova Scotia they are divided into the lower or quartzite group and the upper or ferruginous and graphitic slate group. The lower group, to which a thickness of over 11,000 feet is assigned by Mr. Faribault, consists principally of quartzite interstratified with numerous beds of slate varying in color and texture and with a few beds of compact conglomeritic rock. The upper group, which is over 4,000 feet thick, is almost wholly composed of bluish-black soft slates.

Following the definition of the extent of the gold fields of the Province as given by the early writers, it would be put down at about 6,500 square miles. Various deductions have been made from this on account of the granite masses which are frequently met. The granite is of an age, roughly speaking, geologically referred to a period later than the Devonian.

Generally the estimates allow that about one-half of the auriferous district is occupied by granite, making the extent of the gold fields about 3,000 square miles. The granite is not generally considered to be auriferous, although gold has been found in quartz veins in it at points far distant from the slates and quartzites.

The upper or slate group is not recognized by miners as auriferous, although quartz veins occur in it and sometimes show gold. It may be found, however, on further examination, that at favorable localities extensive deposits of low-grade ores are presented in it.

Attention has therefore been confined principally to the lower or quartzite group. From Mr. Faribault's observations it appears that the gold belts occur at a distance below the base of the upper or slate group varying from 2,800 to 8,000 feet, giving a thickness of about 5,000 feet of auriferous strata. Veins occur at other points in the lower group of rocks, but have not yet been found to be pronouncedly rich in gold.

It will therefore be seen that wherever this section of the lower group has been folded, denuded, and exposed, there the best fields are opened for exploration and work. The district to the eastward of Halifax has been carefully mapped by the geological survey. These maps are on a scale of 1 mile to the inch, and give minute topographical details, so that the localities where prospecting can be most advantageously carried on are readily observed. In order that information may be available as to the district lying west of Halifax, Professor Bailey has examined, in less detail, the counties of Lunenburg, Queens, Shelburne, and Yarmouth. The maps and reports relating to the gold fields are invaluable to gold miners, and can be obtained by payment of nominal prices from the office of the Canadian geological survey at Ottawa.

The quartz veins of Nova Scotia extend in many cases for thousands of feet, and have been followed to depths of 700 feet in their vertical extension. In size they vary from an inch up to 12 or 15 feet; many of the most productive are from 6 to 15 inches in thickness. They present, in spite of their bedded position, many of the characteristics of typical veins. Their essential ingredient is quartz, varying in texture and color, in many of the more productive veins presenting a smooth surface and bluish shade. There is always present a varying percentage of iron, copper, lead and zinc sulphides, and traces of other minerals. Cross or fissure veins also occur at Rawdon, Caribou, Blockhouse, Oldham, Brookfield, etc., and are frequently productive.

The gold is present characteristically in the free state as irregular masses, varying from microscopic particles to irregular patches, often several ounces in weight. It is also present in films covered by the metallic accompaniments, and as invisible particles in them. There are also quartz veins almost free from sulphides, etc., yielding gold in workable amounts, although it is not visible. But little attention has yet been paid to this class of veins, unattackable by the ordinary quartz mills, although adapted for chemical treatment by the more modern systems. In the veins the gold is sometimes distributed with comparative uniformity over considerable areas; usually, however, it is more or less concentrated within certain defined limits, leaving spaces on each side comparatively barren. These enriched zones are known as pay streaks, are repeated in some veins, and follow certain laws not yet clearly understood. They have hitherto been the principal source of the gold production.

Gold is also found sparingly in the quartzite beds and more abundantly in the slates. The latter when in contact with the quartz frequently show it in thin platings, and the small veinlets of quartz seaming the slates often carry gold. When one or more quartz veins occur in connection with a slate bed, the whole bed is frequently rich enough to be worked as a low-grade ore. As will be shown further on, practical experience has taught the miner that profitable low-grade ore means material yielding in an ordinary stamp mill from \$2 to the ton and upwards.

ALLUVIAL GOLD MINING.

The early prospecting developed promising alluvial deposits at several points. At Tangier it was shown that a large extent of surface carried gold, and several hundred ounces were washed out. The limited extent of the areas, however, did not allow of systematic work, and attention was diverted to the rich vein outcrops. The most interesting alluvial development was at the Ovens, near Lunenburg. Here the sea has worn a number of large cavities in the cliffs which are composed of soft slates with small quartz veins often showing gold. The action of the waves concentrated the gold washed from the slates along the beach near these openings, and during the years 1861 and 1862 about 2,500 ounces were returned as taken out. It is believed, however, that only a small part of the gold extracted was accounted for. Since that date small amounts have been secured by persons living in the vicinity. The richness of the alluvium directed attention to the neighboring quartz veins, but they proved uncertain and unprofitable with the crude methods of that day. Trial crushings of the quartz and slate from several points in this district would indicate the feasibility of dealing with them on a low-grade basis.

At Gays River explorations have shown that a conglomerate of Lower Carboniferous age, lying on the gold-bearing slates, carries at its junction with them considerable amounts of gold. At one time profitable mining was carried on here on a small scale along the edge of the outcrop of the conglomerate; but the miners turned their attention to richer districts. As the conglomerates at many points in this district show gold, it is to be regretted that more attention has not been paid to them, as in a certain degree a parallel can be traced between them and the South African gold fields.

Promising alluvial ground exists on the Nine Mile and Meander rivers, at Renfrew, in the southern part of Waverly, and in the vicinity of other gold fields. In fact, at any favorable point south of the passage of an auriferous anticlinal sights of gold can be obtained by panning, which would in California or other countries where alluvial mining is a recognized practice lead to immediate attention.

However, little attention has been paid to this source of gold for many years, although it has been well within the knowledge of miners that in every district the immediate surface cover contains much gold in boulders and free in the earth. At Moose River Mr. Touquoy, a miner who acquired his experience in Australia, has for a number of years systematically passed the surface earth of his areas through his crusher with profitable returns. There can be no doubt that at many points this system could be advantageously united, as in his case, with the crushing of underground quartz.

It is true that in this Province there may not be the enormous deposits of auriferous gravel which have elsewhere permitted of the investment of great amounts of capital to wash over with water brought from sources many miles distant millions of tons of material to glean a profit from their scanty gold contents; but it may be stated confidently that the deposits here are much richer and that they will prove more remunerative.

At the last session of the legislature an act was passed to allow of large tracts of ground being taken on almost nominal terms for a period of three months to permit of preliminary investigation for the purpose of alluvial mining. This arrangement permits capital to secure cheaply unbroken stretches of ground, which, if found valuable, can afterwards be brought under the regular conditions of the mines act.

In this connection it is interesting to note that indications of gold deposits are found in alluvials outside of the recognized or working gold fields of the Province. Gold has been found in this manner in Digby County, along the Cobequid Mountains, in the northern part of Guysboro County, and in almost every river flowing from the Pre-Cambrian tableland of northern Cape Breton. It is not known yet if this gold is derived from workable veins carrying free gold, from the schists which sometimes show gold, or from the oxidation of sulphurets which often form a considerable percentage of certain beds. At Middle River and Whycocomagh, in Cape Breton, free gold occurs in the quartzites and in quartz veins in them. At the latter place it also occurs in the sulphides with which many of the felsites, etc., are strongly impregnated.

There appear to be two sources of alluvial gold in the province—first the free gold-bearing veins of the Atlantic coast and the auriferous mineralized deposits, also in places containing free gold, and presented over a large section of the province generally considered valueless for gold mining.

As these remarks may appear somewhat contradictory, I may briefly explain the facts. In Nova Scotia gold mining began in the free gold quartz veins and may be said never to have left them. Any vein not showing free gold was pronounced valueless, and this early dictum has been accepted ever since as conclusive. It is true that the presence of free gold in the tailings of the stamp mills was known. However, it was resignedly put down as an inevitable waste accompanying that method of extracting gold. The presence of gold in the concentrates was repeatedly pointed out, but the average miner would not go to the expense of saving and treating them or even of shipping them. The result is that as the most resourceful way of dealing with a useless substance was the cheapest method of getting it out of the way, the brooks, swamps, and lakes in the vicinity of the stamp mills became the receptacles of the concentrates from the richest veins that have been worked in the province. Recently this opinion as to the value of the gold unseen by the miner has undergone a change, and it has been practically shown by Mr. W. L. Libbey, of the Brookfield mine, Queens County, that tailings and concentrates can contribute their quota to the miner's profit.

It can be readily understood that this long-established opinion has not favored a search for gold and silver in other strata which have been mineralized by faults, intrusive dikes, etc. Now, however, the practical treatment of the residues of the quartz mills and the presence of widespread signs of gold in alluvium and mineralized veins and zones outside of the free gold districts has opened up a new field to the prospector, and, as in Cape Breton, he is availing himself of it.

HISTORY OF GOLD MINING.

The discoveries of the fabulous gold deposits of California and Australia had prepared the minds of Nova Scotians, and a tremendous excitement arose when the presence of gold in the province was established. It is true that the first reports were listened to with incredulity by those in power, but public opinion, inflamed by the sight of the beautiful specimens from Tangier, compelled a legal recognition of the various districts.

The first claims were limited in size, and operators soon gave them up. Gradually companies acquired control of areas, put up mills, and started with high hopes. In many cases large profits were realized for a time in spite of every form of extravagance, of poor mills, and unskilled mining. This continued for a few years, when the laws of finance and mining resumed their sway. The veins opened on the richest points of the outcrop of their pay streaks gradually became too poor to pay. The treasuries of the companies, after lavishing dividends from the proceeds of the richest ore, had nothing left for a rainy day. There was nothing in reserve to pay for deeper shafts and larger machinery, and the shareholders refusing to advance money in what appeared useless attempts to maintain mining, company after company closed down or passed into new hands.

The state of affairs can not be better described than by an extract from the report of the Hon. R. Robertson for the year 1868:

"The mining hitherto has to a great extent been done on the supposition that the quartz was in veins and not in beds, and when a rich spot is worked out or the vein narrows down it is supposed that the mine is exhausted.

"A number of well-paying mines have been abandoned at a depth where manual and horse power were no longer able to perform the necessary hoisting and pumping, the profits having been divided and no working capital set aside to meet contingencies. Commencing mines on a small area of ground has proved very detrimental, and there seems to be a mania for working shafts. As an instance, thirty shafts sunk on one lead in a distance of 1,800 feet and twenty-three shafts in 1,600 feet on a lead not more than 50 feet distant. There is also a great lack of appliances and skill in saving the fine gold, and it is computed by good authority that at least 30 per cent of it is lost in the tailings. In consequence of these drawbacks, all of which are remediable, it is a matter of general belief in this year (1868) that two or three years is the lifetime of a Nova Scotia mine."

In 1870 we find, from the commissioner's report, that much the same state of affairs prevailed, and the miners are taken to task for their want of systematic mining.

In 1872 the state of affairs had very materially changed in one respect—the system of working the mines. The tribute system had come into practice, and company

mining had been largely suspended. It became evident that many leads that were considered unworkable by the directors of a company yielded a profit to a party of tributors. The chief objection to the tributors was the desultory nature of their operations, which in many cases led to the flooding and the crushing of the outcrops of good veins.

However, the tribute system marked the commencement of a new era. The enterprising men among the tributors, left to their own scanty resources, found that economy was the mainstay of mining. So by degrees high explosives, improved pumping and hoisting machinery, air drills, better systems of working, and, last but not least, great improvements in mills and milling were introduced, until the practice in Nova Scotia is fairly abreast of the times. As the success of many of the tributors became known capital was gradually again available, and at the present time the greater number of the companies working in the province are successful whenever they have been started on a business basis and properly managed.

When companies have been formed to purchase and develop "prospects" they run their chances, and, following the well-known rule of all mining districts, score more failures than successes. When, however, in this province a property has been developed enough to show a reasonable working chance, capital may be safely invested.

MINING.

Reference has been made casually to the primitive and wasteful methods of gold mining which existed for many years in Nova Scotia. Gradually this has changed in the case of companies and individuals operating under the direction of competent mining engineers, although there is still a good deal of the prospect style of mining. Now at many of the mines shafts are sunk at the proper places, and ground systematically blocked out, and the operations underground are carried on with economy and system. Properly designed machinery is largely used for pumping, hoisting, and crushing, and the mills are carefully built and run with proper attention to the details essential to this metallurgical process, which is really much more complicated than would be believed from a casual glance at a mill. Interesting details on the best system of milling the quartz of this province are given by Mr. Hardman in a paper published in the transactions of the Nova Scotia Institute of Mining Engineers for the year 1892-93. These transactions give many other interesting papers touching on gold-mining practice in our gold fields. It can be said for the benefit of investors that our gold-mine managers can stand comparison with those of any other country in their ability to mine systematically and to treat economically the extracted material.

To show this, I quote from a paper read by Mr. A. A. Hayward at the last meeting of the Nova Scotia Mining Society, in which he gave his experience in shaft sinking at South Uniacke and Montagu. At South Uniacke it was decided to sink a 5 feet 6 inch by 12 feet shaft 404 feet through hard quartzite. The work was completed in one hundred and forty days, of which sixteen were occupied in timbering. The average rate sunk was 3.02 feet per day; the total cost of explosives per foot sunk was \$1.22, and the average monthly rate of sinking was 71 feet 6 inches, the highest rate being 85 feet in one month. The total cost, including management, fuel, and everything chargeable to the shaft, was \$4,647, or \$11.50 per foot, the shaft being left completed, timbered, and ready for occupation.

At Montagu, during 1897, the shaft of the Golden Group Company was sunk 100 feet below the 200-foot level. The work would have been finished in twenty-five days had several days not been lost in taking down and saving a small rich lode on the foot wall. The cost of this sinking per foot was a little in excess of that at Uniacke. These two instances show that the ordinary cost of sinking can be most materially reduced when the work is fully planned out and carried on systematically.

A paper read by Mr. W. L. Libbey at the same meeting gives some interesting figures as to his experience in mining and milling at Brookfield, Queens County. He compares hand and machine drilling as follows:

"In making comparisons with the cost of landing ore at the rock breaker on other mines it must be remembered that the fissure vein at Brookfield averages not over 14 inches in width of crushing material. The extreme depth perpendicularly of the working of the mine is 450 feet. The figures given include the cost of sinking and drifting, and also in the first table is covered the cost of excavating a large chamber to hold a double-plunger Northey pump and a cistern capable of holding mine water for twelve hours.

"During six months, from May 1, 1897, to November 1, 1897, 5,606 tons of ore were sent to the mill, at an average cost of \$2.54 per ton, as follows, for ore landed at the rock breaker:

Labor (which includes blacksmiths and deck men)	\$11, 173. 99
Timber and poles	392. 40
Shovels	35. 20
Picks	20. 60
Blacksmith's coal, 6 tons, at \$10.66 per ton	63. 96
Charcoal, 300 bushels, at 15 cents per bushel	45. 00
Axes	5. 00
Hoisting ropes (estimated)	50. 00
Candles	364. 29
Loss of steel	71. 82
Fuel at pumping station and mill	1, 046. 00
Explosives	654. 75
Iron, including rails for tracks	126. 70
Miscellaneous expenses	125. 00
Lumber	45. 00
Total	14, 219. 91

"Following are the figures for three months of work with the Ingersoll Sargeant Air Plant. The results are especially gratifying, as many old timers have flatly stated that a small lead could not be worked as cheaply by an air plant as by hand labor, and in one instance recently an air plant has been discontinued and a return made to hand drilling. The months taken are January, February, and March, 1898, during which time 2,840 tons were sent to the mill at an average cost of \$2.44 per ton, as follows, for ore landed at the rock breaker:

Labor (which includes blacksmiths and deck men)	\$5, 078. 95
Timber and poles	198. 80
Shovels	10. 00
Picks	2. 00
Blacksmith's coal, 4½ tons, at \$10.66	47. 97
Charcoal, 150 bushels, at 15 cents	22. 50
Hoisting ropes	25. 00
Candles	171. 00
Loss of steel	11. 25
Fuel at pumping station and mill	717. 00
Explosives	512. 50
Iron, including rails for tracks	43. 45
Miscellaneous expenses	75. 00
Lumber	25. 00
Total	6, 940. 42

"The result thus far is apparently to place our ore at the deck head 10 cents per ton cheaper with an air plant than by hand work.

"Following is a table showing the expense of running the 20-stamp mill for six months, commencing September 1, 1897, and ending February 1, 1898. During this time 5,910 tons of ore were milled and concentrated, at an average cost of 63 cents:

Fuel	\$876. 00
Labor :	
2 firemen	360. 00
3 amalgamators	900. 00
2 concentrator men	420. 00
1 carpenter	242. 65
1 engineer	300. 00
Miscellaneous expense, including lubricants	75. 00
Cost total for shoes and dies	397. 53
Mercury lost, 79½ pounds, at 60 cents	47. 55
Screen wire, 192 feet, at 50 cents	96. 00
Total	3, 714. 73

The paper from which these brief extracts are given was read by Mr. C. F. Andrews at the Montreal meeting of the Canadian Mining Society in 1897. I may add that no attempt has yet been made at this mine to rework the tailings and to save the con-

centrates, and undoubtedly had this been done from the first the profits would have been largely increased.

The climate presents no obstacles to mining, and operations are carried on throughout the year. There are no heavy falls of snow, and no heavy freshets or rainy seasons. The mines themselves are, with very few exceptions, dry, and pumping charges are not heavy when proper provision is made for diverting the surface water. All the districts are accessible by roads passable for heavy loads; some are close to railways, and many are on tide water, or only a few miles removed from it. Few, if any, gold-mining districts are more favorably situated for procuring supplies. Mills, boilers, engines, and all the innumerable mechanical aids to mining are manufactured in the country and within short distances of any district. Labor is plentiful.

CONCENTRATES.

Mr. F. H. Mason, metallurgist, of Halifax, has kindly contributed to this report a memorandum on the tailings and concentrates of our Nova Scotia gold ores, as follows:

"Until the beginning of the year 1897 it may practically be said that no systematic attempt had been made to obtain anything but free-milling gold from the ores of Nova Scotia. It is true that concentrators were erected at both Oldham and Waverly many years prior to this date, and were run at intervals with very little measure of success. The class of machines used at both these places was the 'Golden Gate,' a machine requiring constant attention, and even then giving results far from being satisfactory. That the makers have ceased to manufacture it is probably the best proof of its inefficiency. Notwithstanding the disadvantage resulting from the class of machine employed, the concentrates obtained in a custom mill at Oldham were of such a high value that it is surprising that attention was not given to the concentrating of tailings in other parts of the province at a much earlier date than last year. The average value of the concentrates obtained at Oldham was from \$60 to \$70 per ton of 2,000 pounds. I am given to understand, however, that no systematic record was kept of the percentage of concentrates saved nor of the gold lost in the tailings after they had been over the concentrators.

"At the Lake View mines at Waverly 8 Frue Vanners were erected to treat the tailings from 30 stamps, or two-thirds the number required by good practice. So that here, although the class of machines was excellent, the number of machines was insufficient to handle the quantity of tailings going over them, and good results were consequently not obtained. The value of the concentrates, which at times contained a considerable proportion of sand, ranged from eight to thirty dollars per ton.

"About 1881 W. A. Mirral, of Colorado, started a chlorination plant at Waverly. The plant consisted of a very small hand-roasting furnace, and a homemade Plattner chlorination plant of the crudest description. The whole thing proved a complete failure. Two years later B. A. Temple, of Waverly, joined Mirral and put in a new furnace and new leaching and precipitating vats, etc., to start a Plattner plant. I have examined this plant and have never seen or read of anything quite like it. How successful work could ever have been expected from it is a little difficult to see. It is perfectly evident that those connected with the erection of the plant had not even an elementary knowledge of the business, and failure was the natural result.

"The early attempts at cyaniding met with a fate similar to those of chlorination. Dr. Kendall and his assistants came from the States and erected a plant at North Brookfield with a view to treating an old tailing dump at that time (about 1893) owned by the Brookfield Gold Mining Associates. Dr. Kendall experimented for some time without obtaining any results, and the Brookfield Associates, who had employed him, gave him notice to quit, and continued the researches themselves for some time with no better results, and the attempt was abandoned.

"These early failures naturally had a bad effect upon this branch of the gold-mining industry and gave the general public the false impression that even if the concentrates of Nova Scotia contained gold it would cost more to extract it than the gold was worth, and the concentrates were allowed to go away with the tailings down streams and among brushwood, never to be recovered. At the time of my arrival in the province it had become generally recognized that the ores of Nova Scotia were free-milling ores, and that gold which could not be saved in the mortars and on the plates of the stamp battery was not worth saving.

"I at once turned my attention to studying this remarkable phenomenon of a country with a large area of auriferous formation in which all the gold was said to be of a free-milling nature, with a view to establish either the truth or fallacy of this then generally recognized state of affairs. By obtaining samples of a number of old tailing dumps and making a number of careful assays of them, I soon discovered the

complete error into which the gold-mining fraternity of Nova Scotia had fallen. Assays of these samples gave from \$2 to \$17 per ton. Of course in many cases a natural concentration had taken place, and these samples did not represent actual losses in the mill, but it did clearly prove to me that considerable quantities of gold were being lost, a large percentage of which might have been saved by the employment of proper machinery.

"During the last five years I have made a large number of assays of tailings, taken both directly from the end of the plates and also from dumps. I have also assayed a number of samples of concentrates.

"The following table of maximum and minimum results from different districts will be of interest:

District.	Tailings from plates.		Tailings from dumps.		Concentrates.	
	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.
	Oz. dwt. gr.	Dwt. gr.	Oz. dwt. gr.	Dwt. gr.	Oz. dwt. gr.	Oz. dwt. gr.
Cow Bay.....	1 18	21				
Sherbrook.....	3 12	21	6 10	3 6	1 8 0	1 8 0
Caribou.....	2 22	14	13 2	a2 23	a12 0 20	2 22
Uniacke.....	8 4	21			13 3 3	1 17 21
Stormont.....	15 8	c1 18	16 22	3 6	a136 1 19	1 7 0
Brookfield.....			13 1	14	12 17 0	1 3 0
Waverly.....	2 15	21	6 12		4 14 1	1 8 7
Central Rawdon.....	2 22	Traces.	14 17	4 16	5 15 0	1 2 4
Wine Harbor.....	3 12	1 0	6 17	3 12		
Tangier.....	1 4	21				
Fifteen-Mile Stream.....	a13 10	7	19 20	7 0		
Oldham.....					3 8 0	1 8 4
Gold River.....			a7 12 20			
Lunenburg County.....					a99 16 18	a21 1 8
Montague.....	b8 2 8	1 4	0 7 0		7 11 16	5 9 16

a Contained amalgam in appreciable quantities.
 b Tailings from ore containing upward of 40 per cent mispickles.
 c The ore was giving only \$2 in free milling gold at time the tailings were taken.

"The results given in the foregoing table clearly show that the stamp mill only saves a part of the gold present in our Nova Scotia ores. It is true in many cases a greater percentage of gold might have been saved by more skillful crushing and amalgamation, but on the other hand it clearly shows the large amount of gold which is going to waste for the want of proper appliances to save it.

"Concentrators have now been running for upward of twelve months at Central Rawdon and at North Brookfield. At Central Rawdon the ore gives 4 per cent of concentrates, having an average assay value of \$30 in gold and \$1 in silver. I am unable to give any values obtained at Brookfield, as the Brookfield Gold Mining Company, Limited, refuse to give any information on the subject.

"Another considerable source of waste in Nova Scotia gold mining is to be found in the waste-rock dumps. At many mines it has been the custom to dump and stow away on the scaffolds nearly the whole of the slate rock mined, much of which is often auriferous. In a paper read by Mr. C. F. Andrews he gave assays, made by myself, of rock taken from the waste dump at the Richardson mine. These samples were not average samples of the dump, but were taken on account of the large proportion of mineral (mispickles) contained in them.

"The following are the assays and percentage of concentrates:

"1. Contained 30 per cent of concentrates, having an assay value of 28 ounces 8 pennyweights of gold per ton.

"2. Assayed 11 pennyweights 2 grains per ton, contained 12.05 per cent of concentrates, having an assay value of 4 ounces 2 pennyweights per ton.

"3. Assayed 17 pennyweights per ton, contained 15 per cent of concentrates, having an assay value of 5 ounces 6 pennyweights per ton.

"Mr Dimock milled a trial lot of slate rock taken from his scaffolds at the Central Rawdon mine which he had previously been in the habit of dumping and stowing. The result was a saving of 60 cents per ton in the mill, while the tailings contained \$2.60 per ton.

"Undoubtedly many other mines might obtain similar results from material which at the present time is being piled on the waste-rock dump or stored on the scaffold under ground.

"I have made a large number of experiments in my laboratory upon concentrates from all parts of the Province, and up to now I have not come across a single instance in which any difficulty has been found in obtaining from 90 to 96 per cent of the

assay value by chlorination. Cyanide, on the other hand, has not proved so satisfactory. In one case I obtained a 94 per cent extraction. With this exception 78 per cent is the best extraction I have obtained, while in many cases the extraction has fallen below 30 per cent, even with prolonged treatment lasting over thirty days.

"There are other sources of gold in Nova Scotia which up to now have received no attention. The stibnites of East Gore are highly auriferous, running at times over 50 ounces of gold per ton and showing no free gold by panning. In several samples of copper pyrites I have found over half an ounce of gold per ton. The fahlores of Cheticamp have assayed as high as \$15 in gold, while samples of rock carrying pyrrhotite have at times run over half an ounce. All of these, especially the first named, will pay for further investigation."

The following table shows the ascertained production of the Nova Scotia gold mines, by districts, from the beginning of operations up to September 30, 1897, the averages per ton having been computed by this Bureau:

NOVA SCOTIA GOLD PRODUCTION, BY DISTRICTS, TO SEPTEMBER 30, 1897.

District.	Period covered.	Tons crushed.	Total yield.	Average yield per ton.	Value at \$19 per ounce.
			Ounces.	Oz. dwt. gr.	
Caribou and Moose River.....	From 1869	106,172	40,805	7 16	\$775,295
Montagu	From 1862	22,652	39,071	1 14 12	742,349
Oldham	From 1862	45,408	49,272	1 1 17	936,168
Renfrew	From 1862	48,142	33,869	14 2	643,518
Sherbrook	From 1862	185,789	127,504	13 4	2,422,576
Stormont	From 1862	109,016	48,522	8 22	921,918
Tangier	From 1862	43,092	20,491	9 12	389,329
Uniacke	From 1866	53,000	37,957	14 2	721,183
Waverly	From 1862	122,346	61,308	10 0	1,164,852
Salmon River.....	From 1883	95,601	39,373	8 5	748,094
Brookfield	From 1887	22,436	14,900	1 13 7	283,100
Whiteburn	From 1887	6,343	9,535	1 10 2	181,179
Lake Catcha.....	From 1882	20,734	22,657	1 23	432,384
Rawdon	From 1887	13,121	9,791	14 5	186,029
Wine Harbor	From 1862	43,322	29,458	13 14	559,702
Fifteen-Mile Stream.....	From 1874	36,896	18,202	9 22	345,838
Malaga	1889-1893.....	18,567	15,180	16 10	288,425
Other districts.....	Since 1862	64,734	46,924	14 12	891,556
Total		1,057,371	664,919		12,633,495

CENTRAL AMERICA.

No official information has been received by this Bureau regarding the gold and silver product of the Central American States since 1894, but the following estimates are made, based on exportations from those States for the years 1897, 1898, and 1899:

GOLD.

Countries to which exported.	1897.	1898.	1899.
United States.....	\$463,946	\$473,740	\$584,245
Great Britain.....		4,046	
Germany	1,904		
Total	465,850	477,786	584,245

SILVER.

[Commercial value.]

United States.....	\$482,569	\$409,573	\$539,791
Great Britain.....	282	14,818	15,026
Germany	4,284		
Total	487,135	424,391	554,817

The gold product of the Central American States for the years 1897, 1898, and 1899 may, therefore, be taken at \$465,850, \$477,786, and \$584,245, respectively, representing 22,535, 23,113 and 28,263 ounces, or 701, 719, and 879 kilograms, fine; and the silver product at \$487,135, \$424,391, and \$554,817 commercial value, representing 811,892, 717,307, and 924,695 ounces, fine, at a coining value of \$1,049,718, \$930,013, and \$1,195,565, respectively, corresponding to 25,258, 22,377, and 28,767 kilograms, fine.

NICARAGUA.

[Condensed from *Zeitschrift f. Berg-, Hütten- und Salinen-Wesen*, Vol. XLVIII, part 1, pp. 7-11.]

Nicaragua offers a rich field for the miner; all metals, even anthracite and brown coal, are represented, and yet in very few points is serious mining carried on.

Nicaragua can be divided into several geological provinces, which are characterized by the variety of their ores.

The Pacific province is formed by the slope of the mountains from Managua, Granada, and Rivas down to the Pacific coast. The real geological formation is as yet almost unknown. The occurrence of precious metals is not yet known, though their presence is by no means precluded; at least such an assumption is justified by the occurrence of numerous veins of pure or pyritic quartz.

The mountains of the northern part of Nicaragua, in the departments of Nueva Segovia, Matagalpa, and Choutales, rise steep from the low land. The word mountains is here hardly proper, for what appear as mountains from the lowland is in reality the sharp decline of a high plateau, a huge fracture, the length of which, a broad strip of land—the present hollow of the lakes—has sunk below the level. At the foot of this declivity is, in Segovia and Choutales, a hilly landscape; in other places, on the contrary, as in the north of Lake Managua, the transition from lowland to high plateau is unbroken.

This transition zone is rich in ore veins. The lodes are for the most part contact lodes and occasionally of large size. The rock is quartz, with free gold or gold-bearing pyrites, frequently without any other mixture whatever; that is, an ore almost made for the cyanide process. This zone reaches into Honduras, where, e. g., near Namasiguë, not far from the Nicaraguan boundary, ore lodes are found with iron and copper pyrites, also some galena, sulphide of zinc, and in places, finely disseminated argentite. The yield of gold rises up to 2 ounces per ton; the silver yield up to 40 ounces per ton. None of these are worked.

In Nicaragua the mines of San Luis and Santa Francisca belong to this zone. The ore is pure quartz, with free gold or finely disseminated gold-bearing iron pyrites. The lode is very large, up to 8 meters wide. The richest part, which has up to $2\frac{1}{2}$ ounces free gold, is a clayey part of the lode. This clay has proven a great obstacle in the working of the mines and on this account the processes have been changed several times. The part containing iron pyrites yields less gold, and has nowhere more than 1 ounce to the ton and only a part of that as free gold. With the gold a slight percentage of silver is always found, yet seldom more than 2 ounces per ton. The vein is a contact lode and lies against a narrow vein of andesitic or basaltic rock, while the mountain itself is to be classed as porphyry tufa. This

mine, which belongs to an English company, is the only one in Nicaragua which is competently worked by a company with adequate means at its disposal, and yields good returns. The ore lodes of the La Palmita mine, near the city of El Sauce, likewise consist of quartz with free gold, and here also the richest lode is a narrow vein of clayey quartz in which the gold can frequently be seen with the naked eye. This mine is not worked.

Similar to the former are the ore veins of the mine at Agua Caliente, situated on the main road between Leon and Matagalpa. The ore here is also quartz with free gold and gold-bearing pyrites. In addition, one vein contains calcite in some quantity, which at any rate indicates the presence of silver.

Near Teustepe ore veins of gold-bearing quartz are known to exist, but they are not worked.

Whether the ore lodes of Choutales are to be counted with those of the transition zone appears doubtful. The greater part of them lie in the neighborhood of the district of La Libertad. They are principally quartz lodes with free gold and gold-bearing pyrites. Here mining is carried on in various places, but only in a small way. Only the Javali mine, in the north of La Libertad, which originally yielded rich returns, possesses a large plant of stamping mills and still yields good returns.

The plateau of the interior of the country follows the fracture zone. Quartz veins are known in many places, but they are usually devoid of precious metals. Only near San Ramon, in the island of Diabas, are many and good ore veins found, and not only quartz with free gold and gold-bearing pyrites, but also silver ores, lodes with galena, iron pyrites, zinc sulphide, and some copper pyrites, in compact masses or disseminated in quartz. At present few gold quartz lodes near San Ramon are worked, but only in modest proportions. Silver and copper ores are known, but no one has taken the trouble to make a closer investigation. Formerly, however, the San Benito mine, near Muy-Muy-Viejo, was worked, and is said to have promised rich returns. Even now opening operations near Muy-Muy-Viejo are being put under way, and, if one may believe the reports, with alluring prospects. Joining the high plateau on the east is the Atlantic province, which is formed by the gradual slope of the mountains to the Atlantic coast. The whole is a thickly wooded, well watered, and almost uninhabited territory, for only along the larger rivers are a few still unchristianized Indians to be met. Both as regards geology and petrography it is the most interesting part of Nicaragua, but investigations are only possible under the greatest difficulties and privations.

The ore veins are almost everywhere quartz, and in places quite large—up to 15 meters. The ore proper is iron pyrites, with mixtures of copper pyrites, galena, and zinc sulphide. In the decomposing portions which project above the surface the gold appears as free gold; in the deeper portions, on the contrary, as mixed ores. The quantity of gold reaches as high as 4 ounces per ton (in some places still higher), but is usually under 1 ounce per ton. The quantity of silver rises to 10 ounces per ton.

The whole territory has unquestionably a great future before it, since the large size of the lodes, the abundance of wood and water, and the possibility of transporting heavy machinery along the rivers into close proximity to the mines offer the opportunity of working on a

large scale—that is, at small cost. The only obstacle is the absolutely unpopulated condition of that waste of forest, and in consequence the lack of cheap labor and food.

Although gold quartz is found in the whole extent of the territory from Coco River almost up the San Juan River—a few, indeed, quite in the neighborhood of the sea, at Monkey Point Cape—yet the production of gold is by no means important, since everything is still in embryo. Still several American companies have begun to erect plants in the mining district of Pis-Pis, in Prinzapolka; and in a not very distant time the Mosquito coast will become a considerable producer of gold. To a German belongs the credit of having first elicited from the Indians the secret of these sources of gold, and establishing the first gold washings. At present comparatively little gold is won from the washings, and mining proper is coming to the front.

While in the last province, as previously remarked, we have a totally new mining field before us, the wealth of the province of Segovia in precious metals has been known for a long time. This province of Segovia includes that part of Nicaragua which lies between the river Coco and the boundary of Honduras, and undoubtedly reaches into Honduras.

Ore occurs in a great variety of forms, and, as was said before, was known long ago and mined in a primitive fashion. Some places are even to-day worked, but in such a manner that one can hardly call it mining. The ores are gold and silver ores of varying percentage of precious metals, and in many ways resemble those of Prinzapolka. Copper ore also occurs, and even mercury ore is said to have been found.

A characteristic of Segovia is the wide extension of arsenic ores, partly in compact masses of arsenical pyrites or disseminated and mixed with iron pyrites, as well as some zinc sulphide and galena. All of the arsenic ores possess a high percentage of gold. This rises up to $2\frac{1}{2}$ ounces per ton. In addition, the percentage of silver is not small, being much higher than in the pure gold quartzes.

Various attempts have been made to utilize these ores, but in every case with absolutely negative results; and in fact all these mines have gone through the same career.

As a matter of course, amalgamation was employed, since people here have a great horror of everything that may be called scientific innovations. The whole laboratory consisted of the horn spoon, in which, after traditional fashion, the test was made on free gold. If such was found in sufficient quantity (the investigation was of course made only upon the upper decomposed portions of the lode) then mining was begun. An *arastra*, a primitive mill in which the ore is ground with stones, a little mercury being added to amalgamate the gold ground out, was built, or perhaps even a stamping mill was erected, and here and there amalgamating pans employed. At first it would succeed fairly well, as long as the decomposed parts of the lode were worked, but when operations went deeper the yield would grow smaller, because the percentage of free gold naturally decreased when the undecomposed part of the lode was reached. For a while work would still be carried on, the form of the stamps and the pans would be changed, since the blame would be laid on them, until ultimately the stockholders would not, or could not, pay any more. Another, not made wiser by the ill-luck of his predecessor, would try naturally in the same way to work the mine again, and of course the same fate

would overtake him. This explains why, in spite of rich ores, very favorable conditions of climate and of the labor market, abundance of wood and water, mining in Segovia is at a standstill. If a few mines are still worked it is only in order to save the mine concession, which according to the local law expires in case the owner leaves the mine unworked for two years.

No one here will understand that arsenic-bearing ores can not be amalgamated, and, since the local representative men, the so-called "practical miners," know nothing of chemistry, not to mention the modern processes of chlorination and lixiviation with cyanide potash, for the present all will remain as it is. People here have a dread of intrusting the management and working of mines to scientifically trained men, partly on account of the cost but still more because "such people are too theoretical," although the refutation lies before their eyes. The Santa Francisca mine is worked by English capital and managed only by English engineers, and it prospers. The same applies to the Javali mine in Choutales.

CHILE.

No official information has been received by this Bureau relative to the production of the precious metals for 1898 or 1899. The output is therefore assumed, as in former years, to equal the sum of the exports and coinage.

The exports of gold in 1898 were valued at 2,448,289 pesos, or \$893,625, equivalent to 43,229 ounces, or 1,344 kilograms, fine.

The exports of silver were valued at 7,685,577 pesos, or \$2,805,236, commercial value, which, at the average price of silver for that year (\$0.59), equals 4,754,636 ounces, fine, of a coining value of \$6,147,408, representing 147,916 kilograms, fine.

There was no coinage reported for Chile during the year 1898. Accordingly, this Bureau estimates the production for that year as equal to the exports.

The product for 1899 is assumed to have been the same as in 1898.

The following table shows the official values of the export of gold and silver from Chile since 1889 in customs pesos:

[Estadística Comercial de la República de Chile.]

Year.	Gold ore.	Gold bullion.	Silver ore.	Silver bullion.	Silver sulphides.	Gold and silver ore.
	<i>Pesos.</i>	<i>Pesos.</i>	<i>Pesos.</i>	<i>Pesos.</i>	<i>Pesos.</i>	<i>Pesos.</i>
1890	418,199	532,145	926,375	4,335,218	48,779	275,554
1891	69,142	479,789	174,289	4,506,771	166,023	65,343
1892	19,010	783,638	419,301	5,017,390	117,030	961
1893	33,596	602,761	206,996	4,418,072	175,337	9,225
1894	39,243	1,172,355	401,449	3,857,481	165,098	12,383
1895	54,063	247,794	1,051,034	3,867,412	123,155	28,255
1896	73,475	849,036	1,257,870	4,183,108	418,785	130,182
1897	28,535	905,168	434,231	3,781,125	338,062	46,631
1898	2,554	2,445,735	205,386	6,987,816	434,740	57,635

In addition to that, small quantities of gold and silver were contained in lead and copper ores exported from Chile. The gold and silver contents of these ores reappeared in the product of the refineries of other countries.

The figures for 1898 are given below for reference:

Description.	Weight.	Value.
	<i>Kilos.</i>	<i>Pesos.</i>
Copper ore:		
Containing gold	24,339	2,433
Containing silver	86,962	17,392
Containing gold and silver	5,733	1,300
Silver-lead:		
Ore	11,790	1,557
Bars	13,454	13,596
Total		36,278

Assuming these values to represent fine gold and silver only, and taking no notice of the value of the base metals, the total gold product would be increased by 4 per cent and the silver product by about 1 per cent, which may be disregarded as negligible quantities.

CHINA.

China prepares no official figures as to her gold production. According to the Returns of Trade and Trade Reports for the year 1899, published by order of the inspector-general of customs, at Shanghai, the recorded exports of gold bullion from China to foreign countries amounted to 8,330,610 Haikwan taels, distributed as follows:

Countries to which exported.	Haikwan taels.	United States value.
Europe	2,464,556	\$1,789,126
Hongkong and Macao	703,979	513,905
Japan	5,135,020	3,749,854
India (including Burma, etc.)	27,055	17,750
Total	8,330,610	6,070,635

These figures slightly differ from those given in the Report of the Foreign Trade of China for 1899, on page xvi; upon checking off the exports from the several ports it has been found that the totals of the introductory chapter include coin exported from Shanghai, Foo-chow, and Amoy. The Haikwan tael is taken at the average sight exchange on New York for 1899 as equivalent to \$0.73.

We now compare these figures with those of the recorded imports from China to Germany, Great Britain, India, and Japan. No figures for 1899 have, at this writing, reached this Bureau from France. The *Tableau Général du Commerce et de la Navigation* for 1898, while giving the imports of gold coin from China (3,712,000 francs), contains no item for imports of bullion from China, from which it must be inferred that such imports, if any, were too insignificant to be separately stated and were included, if at all, among imports from "other foreign countries."

The Annual Statement of the Trade of the United Kingdom with Foreign Countries and British Possessions for 1899 gives the imports of gold bullion from Hongkong as 77 ounces, fine, which represents the value of \$1,459. No imports are shown directly from China.

According to the information furnished this Bureau by the courtesy of Mr. A. Sauerbeck, in advance of the official German publication,

the imports of gold bullion from China into Germany in 1899 amounted to 2,748 kilograms, fine. This represents the value of \$1,826,321, which exceeds the recorded exports from China to European countries by only \$37,195, or 2 per cent. This slight discrepancy could easily be accounted for by the fact that the German classification includes under the same head imports both from China and Hongkong, whereas the customs authorities at Shanghai class them into separate groups.

This seems to indicate that the figures of the inspector-general of customs at Shanghai are substantially correct, as regards exports to Europe.

The Annual Return of the Foreign Trade of the Empire of Japan (pp. 338-341) values the imports of gold bullion to Japan from China at 8,095,800 yens, which is equivalent to \$4,041,837. This figure exceeds the exports to Japan recorded by the Chinese inspector-general of customs by \$291,983, or nearly 8 per cent. Some discrepancy between the imports and exports must be expected, partly as a result of the difference in time between the date of shipping and the date of arrival of the cargo, partly due to other causes too numerous to mention. With these allowances, the Chinese figures appear to be sustained by the Japanese authority.

The value of the imports of gold coin and bullion from China and Hongkong to India for the calendar year 1899 has been computed by this Bureau, from the monthly Trade and Navigation Accounts of British India, at 4,755,722 rupees, which, at the rate of 15 rupees for 1 sovereign, is equivalent to \$1,542,915. This includes both coin and bullion, which are not stated separately; nor are the imports from Hongkong stated separately. How much of the total amount was bullion and how much was imported from Hongkong it is impossible to guess.

The exports to India given in the above table are composed of 23,988 Haikwan taels exported from Shanghai, and 6,900 rupees stated to have been exported overland from Yatung, Tibet, without designation of the country of destination. It is assumed, however, from the fact of its being given in rupees, as well as from the geographical position of the place, that the amount was exported to India. The rupees are reduced to Haikwan taels at the rate of 2.25, given by the inspector-general of customs.

Adding together the exports to India and Hongkong, and deducting therefrom the sum of \$1,459, representing the imports from Hongkong to the United Kingdom, we obtain the total amount of gold bullion available, according to Chinese sources, for export to India, viz, \$529,196, which is \$1,000,000 apart from the total for both coin and bullion of the statistical department of the government of India. The figures, therefore, admit of no comparison. In view of the substantial correctness of the Chinese figures for exports to Europe and Japan, it would be unreasonable to assume that, in the exports intended for India alone, a difference amounting to double the exports to Hongkong, or nearly sixty times all the exports directly to that country, could pass unnoticed by the Chinese customs authorities. Making all possible allowances for the confessed deficiency of statistical information regarding the exports of treasure from minor ports (see "Returns," etc., pp. 513 and 711), it is still believed that the figures of the Chinese inspector-general come nearest to the actual exports of gold bullion.

The imports of gold bullion are stated by the inspector-general at 696,036 Haikwan taels (p. xv). It appears, however, upon checking off the imports by ports of entry, that this total includes coin to the amount of 2,648 taels imported at Shanghai. This reduces the imports of gold bullion to 693,388 Haikwan taels, which leaves a balance of 7,636,222 Haikwan taels for the net exports of gold bullion.

In the absence of information regarding gold production in China, her net exports are assumed to represent her annual production. This places the gold product of China for 1899 at \$5,574,443, which corresponds to 269,664 ounces fine.

The net export of gold bullion from China for the years 1897, 1898, and 1899, as given by the inspector-general of customs, are presented in the following table:

Years.	Haikwan taels.	Rate of ex- change.	United States value.	Weight.
1897	8,511,700	72	\$6,128,424	<i>Fine ounces.</i> 296,463
1898	7,703,843	70	5,392,690	260,871
1899	7,636,222	73	5,574,443	269,664

There are no available data for the production of silver in China.

GOLD IN QUANTUNG PENINSULA.

[From Consular Reports, July, 1900, p. 369.]

It was recently published that an engineer had discovered rich gold mines in the Quantung Peninsula, and that Port Arthur itself stood on ground unusually rich in auriferous deposits. It may now be said that all such reports are greatly exaggerated, and this particular officer found no gold at all; only some quartz, whose gold-bearing qualities are yet to be tested.

The mining engineer, Bogdanovich, sent to Quantung by the ministry of government land and property, has prospected in that region, but the results are not as yet officially published. It is known here, however, what some of his conclusions are. He proved the presence of gold in three qualities—beach sea, placer land, and quartz in veins. In the last he found visible ledges of quartz containing free gold. In the gold sand of the first quality were found separate parts of the precious metal, or nuggets. In the gold sand of the sea mining, 8 miles from Port Arthur, a gold nugget weighing one-fourth of a pound was found by three Chinese workmen; but they prudently divided the nugget into three pieces and disappeared in as many directions.

It is rather early to say anything definite, but there is no doubt that there is gold in the Quantung, for the administration has taken the precaution to establish a strict guard, and has prohibited mining until further orders are received from the ministry of agriculture and government property.

R. T. GREENER, *Commercial Agent.*

VLADIVOSTOCK, *February 20, 1900.*

PRODUCTION OF GOLD IN CHINA.

[Translation from *L'Economiste Européen*, Paris, May 4, 1900, p. 548.]

The customs statistics of the last few years show that the value of the gold exports has varied between 7 and 8½ million haikwan taels (or between 25,900,000 and 31,450,000 francs) per year. To this amount must be added the domestic industrial consumption, which must be considerable, but the value of which it is impossible to estimate.

On the other hand the Chinese frequently bury gold to have it ready for use in times of political troubles.

The major part of the production of the north of China is purchased by the gold dealers or brokers of Peking, who have a high standing within the Empire and abroad. The bars bearing the marks (chops) of these brokers are eagerly sought for.

From Pekin the bars are sent to the market of Shanghai, whence they are exported either to Europe or Japan through the intervention of the foreign banks.

The Shanghai market receives from Hankow gold coming from the provinces of Yunnan, of Szetchuen, and from the regions traversed by the Yangtze.

It would be a mistake to place absolute confidence in the statistics of the customs administration. The official figures collected at Tientsin during the last ten years show an annual value varying between 1 and 4 million haikwan taels (from 3,700,000 to 14,800,000 francs), or an average of $8\frac{1}{2}$ million francs per year; but private information from reliable sources enables us to state that a great deal of gold coming from Tientsin has been placed on the Shanghai market without having passed through the customs.

The value of the bars originating in the province of Hankow and the districts watered by the Yangtze during this period averages annually 5 million haikwan taels (18,500,000 francs).

COLOMBIA.

The director of the central office of statistics of Colombia states the total production of the country from 1753 to the end of 1887 as follows: Gold, \$165,854,835; silver, \$17,691,978.

In 1893 the United States minister to Colombia made an estimate of the production, which has been accepted ever since, but which, with the heavy increase of silver production, has become manifestly incorrect. In default of a better method, the production can only be estimated as equal to the bullion and ore exports. It seems impossible to secure direct official figures of these from Colombia, but it may be assumed that most of the precious metals exported from that country come to Great Britain or to the United States. Following are the returns:

COLOMBIAN GOLD EXPORTS.

	1897.	1898.	1899.
Into Great Britain.....	\$1,827,156	\$1,959,705	\$1,608,918
Into the United States	265,727	169,210	170,849
Into Germany, France, and Spain	134,300	29,750	<i>a</i> 29,750
Total	2,227,183	2,158,665	1,809,517

a 1898 figures repeated.

COLOMBIAN SILVER EXPORTS.

[Commercial value.]

	1897.	1898.	1899.
Into Great Britain (bullion)	\$2,523,535	\$2,811,248	\$1,858,995
Into Great Britain (ore).....	495,561	421,765	209,308
Into the United States.....	9,301	2,380	44,635
Total	3,028,397	3,235,393	2,112,938

From the value of the fine product its weight is computed; the results, presented in tabular form, are as follows:

Years.	Gold.		Silver.		United States coining value.
	Kilograms.	Ounces.	Kilograms.	Ounces.	
1897.....	3,351	107,740	157,022	5,047,328	\$6,525,838
1898.....	3,248	104,425	170,598	5,483,717	7,090,058
1899.....	2,723	87,535	109,555	3,521,563	4,553,132

GOLD.

[From Mines and Quarries, part 4, 1898.]

This is the most important mineral of the country. The precious metal is obtained by hydraulic mining, by dredging the beds of existing rivers, and by working auriferous veins. Antioquia, Cauca, and Choco are the principal mining districts.

EAST INDIES.

DUTCH.

BORNEO AND CELEBES.

Minister Newel reports the product of gold of the Dutch East Indies for 1898, as follows: Borneo, 118,678 kilograms, to the value of about 170,000 florins; and Celebes, 122,000 kilograms of gold ore.

The value of the gold ore from Celebes is not given and no calculation can be made as to its value. The value of the Borneo product was \$68,340.

Mines and Quarries says that the product of the Dutch East Indies for 1898 was 177 kilograms, fine, and this gives a value of \$117,600, at which figure it is taken in this report for 1898 and repeated for 1899.

MINING BUBBLE IN DUTCH INDIA.

[Consular Report No. 230, November, 1899, pp. 433, 434.]

Since the earliest times it has been known that gold existed in the islands of this colony in more or less infinitesimal quantities. Reports were started about boat loads of natives having come into the various settlements around the coast with their canoes loaded down with nuggets of gold. The Batavia and Soerabaya newspapers were filled with letters and articles written by so-called travelers and prospectors, giving accounts of the fabulous mineral wealth of the islands, and declaring that they would prove a second Klondike.

The next thing done was to start "exploration companies," with capitals varying from \$100,000 to \$1,500,000, according to the money-drawing qualities of the directors and the possibilities of finding the gold. Where the prospects were the most hopeless, they generally started with the biggest capital. The money being raised and the concessions obtained from the government, it was considered necessary to do something for form's sake to satisfy the stockholders, and expert mining engineers from the United States and Australia were engaged at large salaries to make a pretense of prospecting. Expensive mining machinery was imported, the commission being usually given to some impecunious friend of one of the directors, and the public was informed that work was proceeding. From time to time (as a rule, I noticed, when the mining-share market happened to be sagging a bit) enthusiastic letters from the engineers would arrive giving glowing accounts of the prospects, and then the directors would go around whispering confidentially that they had just a few more shares left, which they would be willing to let go at a point or two under the market as a favor.

No means were neglected to induce the public to buy; even poor half-caste clerks, struggling along on pittance of \$40 a month or less, and government school-teachers were persuaded to invest their savings.

What is the net tangible result of all this? A number of men who two years ago were on the verge of bankruptcy have made fortunes, the public is loaded with stock which at present happens to be selling pretty fairly on account of an artificial boom, lots of money has been earned by brokers, but no gold is in evidence.

For the last year I have been in direct correspondence with mining engineers in some of these concessions, and speaking confidentially to me they do not hesitate to tell the truth. With possibly one or two exceptions it can be stated that none of the present mining concerns in the Celebes amounts to anything, so far as the prospect of getting gold in paying quantities within the next ten years is concerned. One man, of great experience in every part of the world, goes so far as to say that they never will get gold in any amount. Meanwhile the infection has spread to Singapore, and even to Holland, whence numerous orders have been received of late. There are indications that the insiders here are now beginning to think of unloading altogether shares that did not cost them a cent in the beginning.

In all this combination of greed and plunder I do not wish to be understood as saying that there are no honestly conducted undertakings. Even if gold never results in paying amounts, there are two or three of these companies that have been managed with a perfectly honest and genuine desire to find it. The Dutch, while good agriculturists and traders, are not good financiers, and in the long run it is to be feared that the honestly managed concerns will, when the bubble bursts—as it inevitably must some day—fare as badly as the out-and-out swindles.

GOLD IN THE DUTCH EAST INDIES.

[Translation from *Zeitschrift für das Berg-Hütten- und Salinenwesen*, Berlin, Vol. XLVII. Part 5, p. 438.]

The production of gold has shown a heavy decrease in the last four decades and the alluvial mining carried on by the natives does not at present produce more than 180 kilograms annually. Most of this comes from Borneo, whose production in 1848 is said to have been valued at 1,409,000 florins. Especially since the Dutch Government and most of the native princes forbade the payment of taxes in gold dust, the indolent natives have devoted themselves to other and less laborious fields of work. Most of the rock mining has also been gradually given up.

The prospecting for gold which the government undertook produced no favorable results because experienced miners could not be secured and but little time and money were devoted to the object. To the Dutch inhabitants mining was an almost unknown field, and they made no efforts to ascertain whether any precious metals were present. The work of the mining engineers, the first of whom was appointed in 1850, was especially devoted to investigating the geological conditions, from 1878 to 1895. Because of the difficulties just mentioned, the work has proceeded very slowly, and only Madura, a few of the residencies of Sumatra, three districts in Borneo, and a small part of North Celebes could be taken up in a general way. From the sixties to the eighties the work of the department consisted in boring for water and seeking for coal, tin, lead, copper, mercury, etc. In the eighties, and perhaps earlier, some Australian gold hunters, who seemed to have heard of the presence of gold in the Bay of Tomini (in north central Celebes), attempted to settle and make contracts with the petty rajahs there. The Dutch-Indian government prevented this, however, on political grounds. At about the same time speculators in Sumatra and Borneo secured mining grants, but were only partially successful. Prospecting for gold was first stimulated by successful work in Soemalata and Paleleh (on the north coast of Celebes), which was begun in 1892 by Swiss, Germans, and Australians, but which did not produce results for several years, because the investigations of the old mines were made without the proper technical knowledge, and, at first, capital could be secured only with difficulty. In time several thousand tons of pyritic ore were taken out and exported, most of it containing $5\frac{1}{2}$ to $6\frac{1}{2}$ ounces of gold and 15 to 20 ounces of silver per ton of ore.

The lack of interest in these undertakings was suddenly changed in 1896 and 1897 when the Australian Atherton published an exaggerated estimate of the fields west of Paleleh and was supported by the government engineer. An epoch of wild-cat mining companies then ensued, which were organized to prospect for gold in Celebes, Borneo, Sumatra, Halmaheira, etc. Because of the heavy traveling and freight expenses and because the companies, the smaller ones included, had high-salaried officers and translators, many of them suspended at the point when they were near successful results. In general, the conditions for successful mining are favorable; cheap labor, cheap wood and fuel, as well as favorable political conditions are present. Many of the fields are only a few kilometers from the coast. The geological conditions of the older islands—Sumatra, Celebes, and Borneo—make the presence of gold deposits and ores pretty certain. The most varied, old, and recent sediments and volcanic rocks are represented in the archipelago, though on account of the heavy weathering and the layer of mold resulting from the rank vegetation they are not sufficiently uncovered, and in many localities are hidden by volcanic ashes or by coral formations.

BRITISH.

NEW GUINEA.

Mines and Quarries says the product of gold of British New Guinea for 1898 was 188 kilograms, fine. This gives a value of \$124,945.

MALAY STATES.

Mines and Quarries says the product of gold of the Federated Malay States for 1898 was 738 kilograms, valued at £83,175, equal to \$404,771 and representing 609 kilograms, fine.

Accordingly, the product of British East India for 1898 was 797 kilograms, or 25,625 ounces, fine, equal to \$529,716.

Consul-General Moseby, at Singapore, sends the following report for 1899:

The only recorded export of gold from the Federated Malay States is that exported from Pahang in 1899. The weight of gold exported from Pahang in 1899 was 18,507 ounces of gold, valued at \$740,280, calculated at \$40 per ounce, but taxed on the valuation of £0.3 5s. 0d. per ounce, also cyanide of gold weighing 196 ounces, at \$2,548, calculated at \$13 per ounce, but duty free. Gold concentrates 844 piculs, roughly valued at about \$30,000, calculated at \$35 per picul, but no duty paid in 1899.

The Bukit Mas mines were closed at the end of 1898, and no gold was exported from Perak in 1899.

These values are evidently Mexican dollar values, and the average value of the Mexican dollar in London for 1899, according to the British Mint Report was $27\frac{1}{8}$ pence, equivalent to \$0.55, which gives the value in United States currency, of the total gold exports, at \$425,055, corresponding to 640 kilograms, or 20,562 ounces, fine.

AMERICAN.

PHILIPPINE ISLANDS.

[From Mines and Quarries, part 4, 1898.]

GOLD.

Large quantities of gold have been extracted from alluvial deposits and quartz veins, and it seems likely that gold mining will become a prominent industry of these islands.

GOLD IN THE PHILIPPINES.

[From Consular Reports, September, 1899, p. 186.]

From the London and China Telegraph, London, July 10, 1899, the following is taken:

"Filipinos have proved about as indifferent to the mineral wealth of their islands as the Boer farmers of the Transvaal to the riches lying beneath the surface of the ground. Consequently, the Philippines present a tempting enough field to British enterprise, which, indeed, has already struck root in the islands—notably on the shores of Paracele Bay, in Luzon, where, with skilled labor and modern methods, it has given an earnest of what may be expected in the future. Paracele gold is well known in Manila, but few Manilese even know where Paracele is, and fewer still have ever visited the place.

"To the question, 'How is it that so little is known of Philippine gold?' the simple answer is that hitherto there has been no official control of the output, and, strange to say, no tax upon it. The miners live in isolated districts and villages with rare communication between them; and the universal man of business is the omnipresent Chinaman, who knows much better than to swagger over the volume of his gold trade. But, apart from Paracele, which may be said to be the Ballarat, if not the Klondike of the Philippines, gold is also found in many other islands of the group, in Cebu, Mindora, Panaon; whilst Mindanao itself is the center of a considerable trade in alluvial gold. The most serious impediment to mining in the Philippines is the utter absence of practicable roads; but this is a drawback that does not apply to Paracele, the headquarters of British gold enterprise in the Philippines (the Philippine Minerals Syndicate), as the reefs are close to the sea, and heavy machinery can be taken in seagoing vessels to within 1,000 yards of where it is wanted. Hitherto the mining

laws and regulations obtaining in the Philippines were those that were in force in Spain, the unit of mining concession being a parallelogram 300 meters by 200 meters, or a superficial area of about 15 acres. But there is reason to believe that under American dominion the conditions of mining will be made much more favorable, and that Luzon will become an important center in the gold industry of the world."

ECUADOR.

Minister Sampson, under date of February 8, 1900, says that considerable quantities of gold and silver have been mined during the year and exported, but that there is no export duty on gold and silver, hence there is no record in the custom-house.

As this Bureau has not at hand the import figures of Germany, France, and England from Ecuador for 1899, an estimate can not be made.

The United States imported from Ecuador during 1899 gold valued at \$47,852, and in the absence of the import figures for the former countries, the estimate of the product for 1899 is assumed to have been equal to the amount of the exports to the United States.

Mr. Perr M. De Leon, United States consul-general at Guayaquil, reports under date of January 22, 1900, the following data furnished him by Mr. C. Van Isschot, a French metallurgist, long a resident of Ecuador, who is regarded as an authority:

GOLD ORES.

A report on the Zaruma district in 1876 by Dr. Wolf caused the formation of several companies, but none of them survived. Afterwards the South American Development Company, of New York, was formed and is now actively and successfully mining. The same can be said of the National, a small native company. The ore found carries 1 to 4 ounces of pure gold per ton, and the vein varies from 1 to 1.5 meters (39.37 to 59.06 inches) in width, occasionally running much wider. It is incased in porphyritic rock, covering an area of about 100 square kilometers (38.61 square miles). The upper or surface veins carry "free gold" to a depth of 20 to 30 meters (65.6 to 98.4 feet). Below this depth it is found generally in combination with copper and iron pyrites; in some cases galena and zinc blendes occur, with specks of pure copper. The yield of these ores is three-fourths of an ounce to 1 ounce, but in some instances rich pockets have yielded 30 ounces, and in one case 300 ounces. After smelting, the product shows 73.04 per cent of gold and 26.06 per cent of silver. Motive power for all purposes is afforded by the Amarillo and Calera rivers, more properly mountain rapids. Timber is found in ample quantity, but transportation is costly. Peons familiar with the business can be employed at from 60 to 80 cents per day in United States gold; native miners, at \$1 to \$1.20; foreigners, by contract. The climate is trying near the streams, even at an altitude of 2,000 feet, but the higher ranges are healthy. Temperature is from 14° to 25° C. (57° to 77° F.), according to elevation.

The district is about 60 miles from the coast and is reached by very bad roads or mountain trails, which make transportation slow, difficult, and expensive, especially during the rainy season, when the road is a mere bog. This is the most serious drawback, work being frequently retarded thereby.

The mining in Zaruma district is principally by drifts, and the mines are self-draining. There are also placer mines in the district, but they have received little attention.

PLACER MINES OF ESMERALDAS.

These were worked under the Spaniards by slaves; afterwards abandoned, and, like Zaruma, are at present in the hands of an American company.

Santiago.—The deposit varies from 2 to 20 meters (6.65 to 66.5 feet), with differing yield. The rocks are porphyry, diorites, syenites, and granite, easily decomposed. Near the Playa de Oro mine is the Angostura, with extensive deposits of alluvial strata, but not now worked.

Uimbi River.—This district was about worked out by the Spaniards. The negroes, however, still find a little gold here.

Cachabi River.—This was for a few years worked by a New York company; now only by negroes.

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SILVER.

There is little data regarding this metal. If any mines were worked during the period of Spanish occupation their locality has been lost. The ores exist in porphyritic formations, but they are hard to trace by reason of being either abandoned or buried; a few are known.

Pillzhum.—Near the city of Azogues are numerous veins running from south to north and east to west at an altitude of 4,500 meters (2.8 miles) from 0.6 to 1.2 meters (2 to 4 feet) in width.

The Matrix.—This is a silicious rock. The silver ore is found in small quantities distributed through the mass with iron pyrites. The dump gives 1 to 2 kilograms—say, 33 to 66 ounces—per ton. A shipment of 77 tons made in 1893-94 from the Constancia mine to Germany averaged 310 ounces to the ton. About 500 tons on the dump showed a yield of 99 ounces to the ton. Some samples yielded as much as 1,253 ounces of silver and 10 ounces of gold. This property is owned by a native company, which lacks both means and inclination for development. Water and fuel are near and abundant. The ore can be easily treated by lixiviation, and the cost would not exceed 25 cents per ounce.

Zhuja, Malal, and Ger.—These mines, in the province of Cañar, are either drowned or buried.

PRODUCTION OF GOLD.

Despite her ample deposits, Ecuador is at the bottom of the list of South American republics in gold production, largely on account of lack of roads. The Engineering and Mining Journal places the amount produced in 1897 and 1898 at only 199.9 kilograms (440.7 pounds), but this is erroneous, as a portion is used locally and more leaves the Republic by way of Colombia. From June to October, 1899, the South American Development Company exported about \$36,000 worth; they are now shipping about \$7,500 per month. It is believed that this product will soon be doubled or trebled. * * *

The Zaruma district is the most attractive gold field, and the next is Esmeraldas. The deposits of the Napo and the eastern region will not invite development until more accessible. The region north of Zaruma is believed to be rich.

In addition to the deposits of silver previously mentioned, the cordilleras of Cañar are known to possess veins which can be easily exploited, being near the coast. They have been prospected to a slight extent.

FRANCE.

France produces no gold. The production of the French silver mines in 1898 is stated by Ambassador Porter to have been 14,340 kilograms, fine, of a commercial value of 1,434,000 francs. This corresponds to 460,946 ounces, fine, of a coining value of \$595,970. The product for 1899 is taken at the same figures.

GERMANY.

The gold and silver production of Germany in 1899, according to answers received to this Bureau's interrogatories, was as follows:

Gold obtained from refineries 2,604.85 kilograms, valued at 7,251,715 marks.

Obtained from—	Kilograms.
Domestic ores	111. 61
Foreign ores	486. 02
Domestic and foreign sweepings and refuse.....	2, 007. 22
Total	2, 604. 85

Silver produced by refineries, 467,593.05 kilograms, worth at the works 37,831,865 marks, which was obtained from the sources named below:

	Kilograms.
Domestic ores	194, 189. 92
Foreign ores	236, 532. 71
Domestic and foreign sweepings and refuse.....	36, 870. 42
Total	467, 593. 05

As will be seen from the above, the actual yield of gold from the German mines in 1899 was comparatively insignificant, having been only 111.61 kilograms, corresponding to \$74,176. The amount of gold derived from foreign ores, imported, and smelted and refined at the various German refineries, was 486.02 kilograms, and this, having been credited to the countries where the mines were situated, duly appears in the statement of the world's annual production of gold. The third item, 2,007.22 kilograms, yielded by the refineries and obtained from domestic and foreign by-products, sweepings, and refuse, may have, in part, been obtained from domestic auriferous silver ores, but it is impossible to state just what portion was so obtained; and as the largest part of the gold included under this head doubtless was derived from by-products, refuse, and sweepings obtained from various industrial establishments, no notice is taken of it in the estimate for the year.

The amount of silver produced by the refineries in Germany for 1899 may be placed at 467,593.05 kilograms, pure, worth at the works 37,831,865 marks. Of this amount only 194,189.92 kilograms were obtained from domestic ores, and are consequently rightly to be credited to Germany. That portion obtained from foreign ores (236,532.71 kilograms) has, in the proper place, been included in the estimates of the various countries which produced it. For the reason above stated the third item, 36,870.42 kilograms, obtained from domestic and foreign by-products, sweepings, and refuse, has been disregarded in the estimate of the world's annual production.

The coining value of Germany's silver production in 1898 was \$8,070,533, representing 6,242,053 ounces, fine.

GREAT BRITAIN.

The following is a summary of official information contained in the British Mines and Quarries for 1899 relating to the production of gold and silver:

GOLD.

The production of gold in Great Britain up to 1887 was infinitesimal. The output of gold ore (auriferous quartz) from 1875 to 1887, both inclusive, amounted to 33.85 tons, valued at £470.

Gold-mining enterprise dates from 1888, yet the results have so far been quite insignificant and irregular, as appears from the following table:

ANNUAL OUTPUT AND VALUE OF GOLD ORE (AURIFEROUS QUARTZ) IN THE UNITED KINGDOM FROM THE YEAR 1888 TO 1899.

Year.	Quantity.	Value.
	<i>Tons.</i>	
1888	3, 844	£27, 300
1889	6, 226	10, 746
1890	575	434
1891	14, 117	12, 200
1892	9, 990	9, 168
1893	4, 489	7, 657
1894	6, 603	13, 573
1895	13, 266	16, 584
1896	2, 765	4, 257
1897	4, 517	6, 282
1898	703½	1, 158
1899	3, 047	10, 170

All this gold is produced in Merionethshire, Wales. A detailed study of the condition of gold mining in Wales is reproduced in another place, from the Mining World.

From the 3,047 tons of gold ore 3,327 ounces of bar gold were obtained, which were estimated to contain 2,849 ounces of fine gold, valued at £12,086, equivalent to \$58,817, or, according to the valuation of fine gold adopted at this Bureau, worth \$58,894, a difference of somewhat over 0.1 per cent.

Gold was also obtained from imported gold ore and cupreous iron pyrites, as shown in the following table:

Year.	Gold ore.		Iron pyrites.	
	Quantity.	Value.	Quantity.	Value.
	<i>Tons.</i>		<i>Tons.</i>	
1898	1,003	£278,635	651,063	£1,080,543
1899	290	152,351	701,174	1,164,667

The quantities of iron pyrites raised in the United Kingdom are very small and have been steadily falling off since 1876; nodules of more or less pure iron pyrites are picked out at some coal mines, and the mineral is also worked on a small scale in Ireland. The annual production for the year 1899 amounted to 12,230 tons, valued at £4,671. The quantities of iron pyrites treated at the metal-extraction works in Great Britain, and the estimated quantities of fine gold extracted from it, are given in the following table:

Year.	Burnt ore treated.	Gold extracted.	
		Total.	Per 1,000 tons.
	<i>Tons.</i>	<i>Ounces.</i>	<i>Ounces.</i>
1898	374,582	1,721	4.59
1899	372,716	1,712	4.59

At this rate the 12,230 tons raised in the United Kingdom in 1899 must have yielded 55 ounces of gold of unknown fineness, an addition to the annual mining product of less than 2 per cent, which is too small to be taken account of.

SILVER.

All the British silver is produced from argentiferous lead ore. The quantity obtainable from the lead in 1899 was estimated from dry assays at 191,927 ounces, valued at £21,942.

The fineness of the silver product is not stated, but a computation made at this Bureau shows that the value represents standard silver, at the average price given for the same year, as 27⁷/₁₆d. per ounce. This corresponds to 177,532 ounces, fine, of the United States coining value of \$229,536.

The value of the imports of silver ore, including the value of the silver contained in imported lead and copper ores, in 1898 and 1899 was as follows:

1898	£1,145,905
1899	1,032,590

In addition to that, silver was extracted from iron pyrites, as shown in the following table:

Years.	Burnt ore treated.	Total.	Per ton.
	<i>Tons.</i>	<i>Ounces.</i>	<i>Ounces.</i>
1898.....	374,582	299,665	0.800
1899.....	372,716	298,172	0.800

At this rate the 12,230 tons of iron pyrites raised in the United Kingdom in 1899 must have added to the annual product of silver 9,784 ounces. Assuming this product to be of standard fineness, it would add to the mining product 9,050 ounces, fine, of the United States coining value of \$11,701. This gives a total silver product for 1899 amounting to 186,582 ounces, fine, of the United States coining value of \$241,237.

GOLD MINING IN WALES.

The prevailing opinion on the opportunities for gold mining in Wales has been to the effect that gold exists there in small pockets and that the industry is virtually profitless. In 1898 a company was formed, however, with a view to proving whether or not gold mining in Wales could be successfully conducted. In March, 1898, a 30-stamp battery of the same class as employed at the Alaska Treadwell mines was erected at the company's mine, the St. David's (formerly known as the Clogan). The press were invited to inspect the same. The following is a description of the battery given in a supplement to *The Mining World and Engineering Record* (London) of March 10, 1900:

The ore from the mine is delivered to the 30-stamp mill by an aerial wire rope tramway system, and is passed through two 10 by 7 Blake crushers and falls direct into large storage bins underneath, and from there is fed by suspended automatic ore feeders to a 30-stamp battery, with stamps weighing 1,050 pounds each, arranged for 96 drops per minute. The mortars have copper liners inside and also on chuck blocks below the screens, and copper tables 5 feet wide by 12 feet long, electro silver plated, are arranged in front of each battery for amalgamation of the free gold. From there the pulp goes to the Frue vanner plant, comprising 12 Frue vanning machines for the extraction of copper concentrates. The power to drive this machinery is furnished by a 6-foot Pelton water wheel, operating under 200-foot head, capable of giving 191 horsepower, or sufficient to run a 60-stamp mill. The line shaft of the present 30 stamps is arranged for adding 30 more in the future. Water is conveyed to the Pelton wheel by means of a steel pipe line about 2,300 feet long. The 30 stamps have an estimated daily capacity of 100 tons of ore when crushing through a 30-mesh screen. The above practice is exactly similar to the large mills in Alaska.

The company claimed to have solved the problem of successful gold mining in Wales, and expected to extend the area of its operations. At the formal exercises attending the erection of the new battery the chairman warned, however, against attempts to develop other properties in the principality, because he thought they were sure to be attended with failure.

To obtain disinterested information on the actual state of facts, the London Statist commissioned its expert, Mr. R. Mabson, to make a personal examination of the St. David's gold mines. An article from his pen, appearing in the Statist of August 25, 1900, is reproduced here in part:

The existence of gold in Wales, as, indeed, also in other parts of the United Kingdom, has long been known of. Indeed, to go further, companies for obtaining gold in Wales have been formed, though heretofore as companies they have not been

successes. Occasionally private individuals owning mineral deposits, chiefly mined for copper, have come upon bunches of ore rich in gold, and have made large profits; but the St. David's mine is the first undertaking of joint-stock character that has reached the stage of securing profits adequate to yield a dividend. * * * An erroneous idea has been very prevalent that past nonsuccess of Welsh gold-mining companies has been due to the royalty payable to the Government. But in case a property contains any appreciable amount of gold the royalty of £4 per £100 is no important bar.

The mine is situated approximately midway between Barmouth and Dolgelly, say 5 miles east of Barmouth and west of Dolgelly. The region north of the railway line between Barmouth on the west (via Dolgelly and Bala Lake on the east) has numerous outcroppings of mineral deposits, and in several directions ore has been extracted in the past for its copper contents, and here and there gold has been found.

The full title of the mine is the St. David's Gold and Copper Mines, Limited. It was formed about two and one-half years ago * * * to acquire mineral rights over an area of approximately 560 acres. Rights over some 170 acres additional land to the west of the original 560 acres were not long ago secured, making the company's present area about 730 acres. * * * The company has erected a mill of 30 stamps (1,050 pounds), to which are to be added 20 stamps in course of erection. * * * Reviewed from the apex of a hill, the main lode appears well defined for a considerable distance, and has been proved, partly by outcrop, and largely also by actual underground workings, to extend in the company's area approximately a mile on the strike. The reef is interrupted by a dike almost at right angles to the strike of the reef, but the disturbance is not important. The direction of the reef—"strike"—is approximately northeast and southwest, with a dip to the southeast ranging from about 80°, at the greatest incline, to vertical. * * * The company claims to have several outcrops of reef. The most development has been done upon the two northern lines of reef, the one termed the north and the other the main lode. * * * Southward of these two lodes, rich in gold—in parts—there are two other principal copper lodes outcropping, not now being dealt with; and southward again of these there is another long stretch of outcrop evidence of lode, and another stretch less defined. * * *

Originally the principal workings were * * * near by * * * to surface workings. Later it was decided to tap the ore bodies in depth on the two northern lodes, and an adit was driven into the hill * * * from northwest to southeast, at about right angles to the "strike" of the lodes. At some 250 feet the adit came upon the main lode, and then a drive along the reef was commenced, the depth of the drive in the earth from the apex of the hill being some 500 feet. This drive appears to have been carried a distance of some 2,000 feet, and for that distance to have been in the lode itself. Where the dike was encountered and the reef thrown off from its original line, the dike was followed and the reef come upon again and driven on. * * *

It is too technical to deal at length with the various developments near surface, with shafts for air, winzes, and several levels opened; but, broadly, there is a main shaft from surface which connects the upper workings with the 500-foot level, and this main shaft is being continued so as to come into the deep adit level at a depth of 685 feet from surface (vertical from apex). This shaft is west of the dike disturbance, and another shaft has been sunk to the adit level east of the dike. The lower adit level, 685 feet below surface, will be approximately 200 feet above the water line. The north and main lodes are poor in copper contents, but in parts the gold contents are very rich. Some specimens of the ore, indeed, are as rich as high-grade specimens from western Australia, with coarse nuggety and peppered or streaky visible gold. * * *

Ore from the stopes in the upper workings, where the winzes and shafts are, is conveyed to the main shaft and tumbled down it to the 500-foot level, where it is put into trucks and run along the tram rails laid in the 500-foot level. The trucks of ore are conveyed to the mouth of the adit, and the ore is shoveled into large iron buckets, which are passed on an aerial tramway (about two-thirds of a mile long) to the mill. The ore delivered from the tramway at the mill goes in at the top of the mill, and is there, with a minimum of shovel work, passed to stonebreakers if large, or direct if small, and falls automatically into the ore bins feeding the stamps.

The mill is driven by water power. * * *

The results given, according to the official return for three months to June 24, were 4,551 ounces from 5,988 tons, the clean up at the end of July giving 2,061 ounces of gold from 2,944 tons of ore treated.

It must not be assumed that because the yield in gold, divided by the tonnage, gives an average of between 14 and 15 pennyweights that the grade of ore is, as on the Randt, ore containing an average of that quantity per ton. In crushing, a small quantity of

copper is obtained, and any free gold that is not retained on the plates in the mill passes off with the pyrites and base metals into the concentrates. But the proceeds from treatment of a small quantity of rich gold-bearing ore, if added to what may be obtained from the mill, can readily bring up an average to the figures above indicated, even though the bulk of the ore passed over the mill may give very small results.

GREECE.

Greece has no gold mines. Minister Rockhill writes, under date of March 8, 1899, that the silver mines produce annually from 5,000 to 6,000 tons of silver-lead, which sells for about 500 francs a ton. This would make its annual yield about \$579,000, commercial value. Accordingly, the product for 1898 would be 981,356 ounces, or 30,530 kilograms, fine, of the coining value of \$1,268,824. In 1898, however, it yielded, according to the *Statistique de l'Industrie Minérale* for 1898, 41,950 kilograms, fine, valued at 4,135,000 francs, with a United States coining value of \$1,743,442.

In the absence of any information for 1899, the figures for 1898 are taken for 1899.

THE GUIANAS.

The following table shows the product of the Guianas in 1899:

Where produced.	Fine weight.		Value.
	<i>Kilos.</i>	<i>Ounces.</i>	
British Guiana	3,070	98,712	\$2,040,548
Dutch Guiana	884	28,423	587,553
French Guiana.....	2,541	81,691	1,688,700
Total	6,495	208,826	4,316,801

No silver is produced in the Guianas.

BRITISH GUIANA.

Mr. Moulton, United States consul at Demerara, reports that the product of British Guiana for 1899 was 3,517 kilograms.

The Board of Trade Journal of February 15, 1900, says:

The following table, compiled from information published in the *Demerara Argosy*, shows the quantity and value of gold produced in British Guiana in the years 1895 to 1899:

Year.	Quantity.	Value.
	<i>Ounces.</i>	
1895	122,023	£451,200
1896	124,713	461,300
1897	122,702	449,200
1898	113,070	412,200
1899	112,944	414,800

Our consul last year reported: "In this colony the banks purchase it of the mines at \$17.50 per ounce. Its value, as determined in England, is \$18.05 per ounce." The equivalent fineness at \$18.05 per ounce would be .873. At this fineness the 3,517 kilograms reported would yield a fine weight in kilograms of 3,070.34, valued at \$2,040,548, corresponding to 98,712 ounces, fine.

DUTCH GUIANA.

Mr. Deyo, consular agent at Paramaribo, reports that there were produced from the mines of the colony 893 kilograms of gold, valued at 1,223,500 florins, with the statement that it assays about .990 fine, in New York. This would give 884 kilograms, fine, valued at \$587,553, representing 28,423 ounces, fine.

FRENCH GUIANA.

Mr. Moulton, United States consul at Demerara, reports that the gold product of French Guiana was 2,541.332 kilograms, but he does not state either the fineness, or the value. In the absence of this information it is assumed to have been pure, the value of which in that case would be \$1,688,700, representing 81,691 ounces, fine.

ITALY.

The gold production of Italy in 1898 is officially stated to have been 250.1 kilograms, with a value of 859,737 lire, and the silver product to have been 25,568 kilograms, with a value of 2,459,389 lire.

These values correspond, for the gold, to \$165,929, representing 249.66 kilograms, or 8,027 ounces, fine; for the silver, to a commercial value of \$474,662 and a coining value (United States) of \$1,040,177, representing 25,028 kilograms, or 804,512 ounces, fine.

No information for 1899 being available, the figures for 1898 are repeated.

JAPAN.

The figures for Japan are taken from the official publications of the bureau of statistics of the Japanese Empire, and are, as a rule, from two to three years late. The latest annual *Résumé Statistique de l'Empire du Japon*, bearing date the 26th of March, 1900, brings the data on the production of gold and silver up to the year 1897.

The figures for 1898 are those furnished to this Bureau by our minister to Japan and obtained by him from the Japanese Government in advance of the publication of complete official statistics. These figures, being based on preliminary information, are subject to correction from final reports, which have heretofore proved them substantially accurate.

In the table below the preliminary figures for 1896 and 1897, given in last year's report, are compared with the final results:

GOLD.

Year,	Quantity.		Difference, more (+) or less (-).	
	Preliminary.	Final.		
	<i>Ounces.</i>	<i>Ounces.</i>	<i>Ounces.</i>	<i>Per cent.</i>
1896	30,927	30,981	- 54	-0.2
1897	33,555	33,385	+170	+0.5

SILVER.

1896	2,068,450	2,078,396	- 9,946	-0.5
1897	1,686,129	1,748,609	-62,480	-3.6

It appears from this table that the preliminary figures deviated within very narrow limits from the final results. No information having been obtained for 1899, the figures for 1898 must, therefore, be repeated. The values of the gold and the silver products have been computed from their fine weights.

PRODUCTION OF GOLD AND SILVER FROM JAPANESE MINES, 1896 TO 1898.

Years.	Gold.			Silver.		
	Fine weight.		United States coining value.	Fine weight.		United States coining value.
	<i>Ounces.</i>	<i>Kilos.</i>		<i>Ounces.</i>	<i>Kilos.</i>	
1896	30,981	963.6	\$640,434	2,078,396	64,645	\$2,687,219
1897	33,385	1,038.4	690,129	1,748,609	54,388	2,260,828
1898	38,253	1,189.8	790,760	1,660,200	51,638	2,146,521

The British consul at Hakodate reports that in 1898 gold in considerable quantities was discovered in the vicinities of the Tombetsu and Horobetsu rivers and their tributaries in the Kitami and Teshio provinces. For some years previously gold dust had been found in this island in small quantities, the annual output being about 13 kwamme, or 1,570 ounces. This gold was found mostly on the west coast of Teshio.

The center of the newly discovered auriferous area is the mountain Horonoburi, in which are the sources of the streams containing the gold deposits, and it is surmised that rich gold veins exist in the mountain. So far, however, no report of any practical survey seems to have been made, though it is anticipated that this spring will see great developments with more scientific methods. Hitherto the means employed to wash the gold have been very primitive and inefficient, in some cases a piece of common straw matting being used to sift the sand.

According to an official return compiled by the inspectorate of mines at Sapporo the total production of gold dust in the Ezasbi neighborhood, Kitami province, during 1899 was 119,811 momme, or about 14,477 ounces, the value at 4 yen to a momme being about £48,000. This estimate, however, is considered under the mark, and it is stated that 600,000 momme (about £250,000) were exchanged for specie last year at the Osaka mint.

Licenses have already been granted this year to work claims covering 3,447 miles of river bed and 185,757 acres of miscellaneous land, situated not only in the vicinity of the new discoveries, but in all parts of Hokkaido. (Foreign office Annual, series 2, 503.)

KOREA.

Mr. Allen, United States minister resident and consul-general at Seoul, Korea, says, relative to the 1899 product:

Owing to absence of statistics, the production of gold in Korea is unknown, though the amount is considerable. For instance, all the imports from Vladivostok to Gensan are paid for in gold taken out in passengers' luggage, yet there is no declared export of gold to Vladivostok.

Declared exports of gold from Korean ports during 1899 amounted to 2,933,232 yen (\$1,464,419).

The lowest conservative estimate gives an equal amount for the undeclared export, which would make the export of gold in 1899 amount to \$3,000,000. This does not include the amount used for domestic purposes and private hoarding, which is considerable.

The annual production of gold in Korea at present may be regarded as between \$4,000,000 and \$5,000,000.

There are no refineries in Korea. Bullion is shipped by the foreign mining companies to the Japanese mint at Osaka. Concentrates are sent to San Francisco.

The imports of gold from Korea to Vladivostok for 1899 could not be traced from Russian official sources, the latest publication at hand of the Russian Department of Customs being the "Obzor Vneshney Torgovli Rossii" for the year 1897, issued in 1899.

No imports of gold ores or bullion were entered at the Vladivostok port in 1897, nor could any shipments of gold concentrates be traced for 1899 from Korea to the United States through any of the ports on the Pacific.

An examination of the original records of the United States Bureau of Statistics, compiled from the reports of the collectors of customs, shows that all imports to these ports in 1899 can be traced to Australasia, British Columbia, Mexico, Central America, Aden, and Japan, the latter being credited with the sum of \$13,820, representing gold from ores, and all being imported to San Francisco in February, 1899. Whether this gold was primarily of Korean origin could not be learned from the Annual Returns of the Foreign Trade of the Empire of Japan, published by the Japanese department of finance.

The Korean official figures do not specify gold coin and gold bullion in separate items. The total for gold exports—2,933,232 yen—must, therefore, include gold coin exported from Korea. Of this amount, the Annual Returns of the Foreign Trade of the Empire of Japan for 1899 shows 2,438,253 yen to have been imported into Japan, of which 4,561 yen was gold coin. The balance could not be traced to any country, most of the reports for 1899 not being out at this date.

Assuming, therefore, the ratio of coin to bullion in all exports to have been the same as in those to Japan, i. e., about 0.2 per cent, and making allowance at this rate for coin, we obtain the sum of 2,927,366 yen expressing the value of Korean exports of gold bullion, at which figure the gold product of Korea is estimated. This is equivalent to \$1,459,000 and corresponds to 70,579 ounces, fine.

Regarding the gold product of Korea in 1898 the following is copied from *L'Economiste Européen* of February 23, 1900:

The quantity of gold exported and declared at the custom-house increases from year to year; the amount exported from the country clandestinely is at least equal, it is believed, to that declared at the custom-house. The total production for 1898 is estimated at £600,000, and the amount declared at the custom-house was £240,047.

This is equivalent to \$1,168,189 and corresponds to 56,511 ounces, or 1,757.73 kilograms, fine.

These results are given below in tabular form:

Years.	Quantity.		United States value.
	Ounces.	Kilograms.	
1898.....	56,511	1,757.73	\$1,168,189
1899.....	70,579	2,195.30	1,459,000

MEXICO.

The Mexican Government publishes no official statistics of the production of gold and silver. It is estimated by adding the respective values of declared exports and of the coinage for the year, with an additional allowance for industrial consumption. Of these elements the amount of exports, by far the largest, is incapable of exact ascertainment, owing to the fact that a considerable proportion of Mexican gold and silver is exported in various stages of crudeness.

The following table of exports of gold and silver for the calendar year 1899 is compiled from the *Estadística Fiscal*, of Mexico:

EXPORT OF GOLD AND SILVER FROM MEXICO DURING THE CALENDAR YEAR 1899.

GOLD.

Description.	Declared value.
	<i>Pesos.</i>
Gold ore.....	335,849
Mexican gold coin.....	138,334
Foreign gold coin.....	55,118
Gold bullion.....	7,017,286
Gold cyanides.....	105,961
Gold sulphides.....	266,782
Total.....	7,919,330

SILVER.

	<i>Pesos.</i>
Silver ore.....	10,766,099
Mexican silver coin.....	4,761,105
Foreign silver coin.....	816,709
Silver bullion.....	39,259,911
Silver in foundry slag.....	4,810
Silver cyanides.....	76,942
Silver sulphides.....	1,929,055
Total.....	57,614,631

Eliminating the items "domestic" and "foreign" coins from the above table and adding the coinage of the year, we have the following:

Items.	Coining value.	
	Gold.	Silver.
	<i>Pesos.</i>	<i>Pesos.</i>
Exports.....	7,725,878	52,036,817
Coinage.....	676,063	18,749,740
Total.....	8,401,941	70,786,557

In addition to the above estimate of the product, Mexico employs some bullion in the industrial arts; how much is not known, but this Bureau can safely estimate the product for 1899 at \$8,500,000, corresponding to 12,789.64 kilograms, or 411,187 ounces, fine.

At the Mexican coining rate for silver, of 40.915 pesos per kilogram, the silver represents 1,730,088 kilograms, fine, of a coining value (United States) of \$71,902,457, representing 55,612,057 ounces, fine.

The value of the ore, bullion, etc., imported into the United States during 1899 was as follows :

Items.	Coining value.	
	Gold.	Silver.
Bullion deposited at mints.....	\$1 527, 939	\$721, 770
Bullion refined at private refineries.....	5, 440, 992	46, 466, 700
Total.....	6, 968, 931	47, 188, 470

Of the total gold exported by Mexico (\$7,725,878), the United States received \$6,968,931, leaving a remainder of \$756,947 as exports to other countries.

The amount of silver exported by Mexico was 52,036,817 pesos, of which the United States received \$47,188,470, leaving \$4,848,347 as the exports to other countries.

GOLD PRODUCTION.

[Consular Report No. 222, March, 1899, pp. 359, 360.]

Ever since 1886, when silver began to fall to an alarming extent, the Government understood that it would be useful to stimulate the production of gold by facilitating the exploration and working of the placers and conceding special franchises and concessions to companies guaranteeing to work them with sufficient capital. This was the opinion of competent persons who were charged to study the crisis and the means of remedying it; and when, in 1894, things came to such a state that there occurred almost a panic, the Government laid before Congress the law of the 4th of June of that year. This law authorized the Executive to grant, during one year, concessions for exploring and working placer and auriferous mines to companies who guarantee to invest a capital of \$500,000 during the first three years and \$1,000,000 in five years. In exchange, these companies enjoyed a reduction of the annual mining tax up to 10 per cent, and were exempt from all other federal tax except the stamp tax. They could also introduce into the country free of duty the necessary machinery, tools, etc. Three large contracts were executed under this law and they have been exactly fulfilled in all details. They were for the exploring and working of mines in Oaxaca, Sinaloa, and Lower California.

The following table will show the increase in the production of gold:

1892-93.....	\$1, 269, 907
1893-94.....	1, 224, 621
1894-95 (under the law).....	4, 744, 542
1895-96.....	6, 054, 078
1896-97.....	5, 861, 126
1897-98.....	7, 584, 182

These values are at par. According to the average rate of exchange of the last fiscal year, the gold exported represents nearly \$16,000,000 (Mexican).

Taking into account that which is exported surreptitiously, there being certain portions of Mexico, such as the Territory of Lower California, where it is very difficult to control the output on account of the large extent of seacoast, it is not an exaggeration to calculate the production during the last year at \$19,000,000 (Mexican).

It would thus seem that this is a prosperous branch of production, greatly increasing, and giving promise of a brilliant future. The railroad through Guerrero will help to develop even more of this branch of national riches.

As a complement to what refers to the production of precious metals and their progress, I give the table which follows, of the production of silver:

	Mexican.
1881-1885 (four years).....	\$157, 826, 478
1886-1890.....	199, 208, 204
1892-1896.....	225, 247, 459
1896-97 (fiscal year).....	63, 688, 503
1897-98 (fiscal year).....	65, 119, 606

THE MEXICAN MINERAL INDUSTRY.

The Iron Age, of New York, of March 1, 1900, in an article on the Mexican mineral industry, states that silver is and always has been one of the principal products of Mexican mines, and now, with the increase of trade in Japan and China, this metal has a good chance to improve in value. Most of the old mines of Zacatecas, Pachuca, Chihuahua, and Guanajuato districts continue to produce steadily, as many of them have done for the last two hundred and fifty years, and new mines are also being opened up by both natives and Americans. The Sierra Madre regions of Chihuahua and Sonora are also coming rapidly to the front as producers of both silver and gold. The Central Mexican, Sierra Madre, and Chihuahua railroads are doing much, and will do more in the near future, to help the development of this new but wonderfully rich district, which is now easily reached. The favorable rates of freight and the inducements offered by the smelters are causing an influx of miners and capitalists, principally from the Western States of America. Gold quartz in paying veins is found throughout central Sonora and western Chihuahua, but little was done in gold mining in those sections until American prospectors showed their permanent value as investments.

NORWAY.

Annuaire Statistique de la Norvège, 1899, gives the following figures for the production of gold and silver from 1894 to 1897:

Years.	Gold.	Silver.	
		Mining product, ore and bullion.	Product of refineries.
	<i>Crowns.</i>	<i>Crowns.</i>	<i>Crowns.</i>
1894.....	4,000	373,000	380,000
1895.....	8,000	355,000	390,000
1896.....	35,000	400,000	377,000
1897.....	3,000	464,000	480,000

A comparison of the product of silver mining with that of the refineries shows but a slight discrepancy between their values. Of course the two products are not identical; a portion of the silver refined during one year may, and in fact must, have come from the preceding year's mining product; a portion of the ore is exported; the exports for 1897, e. g., are valued at 14,300 crowns (p. 62).

The difference in value between the refined and the crude product from year to year was as follows:

Years.	More (+) or less (-).	
	Crowns.	Per cent.
1894.....	+ 7,000	+ 2
1895.....	+35,000	+10
1896.....	-23,000	- 6
1897.....	+16,000	+ 3

The close coincidence of the value of the mining product with that of the refined product (making all proper allowances as explained above) warrants for the approximate accuracy of the results.

In the calculations of this Bureau the product of mining alone is taken as representing the production of the year. The fine silver contents of the ore and metal are essentially in the nature of estimates before the product is refined, and must be computed from the value of the product. Here lies another source of error, in so far as the average annual price of silver in the London market, at which the computation is made, deviates from the actual prices brought by the several items making up the total product. These deviations are shown in the table below. The weights and values are those of the refined product, as no fine weights could, in the nature of things, be given for the ores.

Years.	Weight.	Commercial value.		Annual average London price per ounce.	Deviation.	
		Total.	Average per ounce, United States value.		Cents per ounce.	Per cent.
	<i>Kilograms.</i>	<i>Crowns.</i>				
1894	4,760	380,000	\$0.665	\$0.635	+ 3.0	+ 5
1895	5,000	390,000	.649	.658	- 0.9	- 1
1896	4,660	377,000	.674	.674	0	0
1897	5,370	480,000	.745	.604	+14.1	+23

It is seen from this table that the variations of the average value per ounce, fine, as given by the Norwegian Central Statistical Bureau, from the annual average price in the London market during the years 1894, 1895, and 1896 were confined within very close limits (1 per cent below and 5 per cent above the average price). The figures for 1897 are an exception, the average valuation being \$0.141 (or 23 per cent) above the average London price of fine silver, whereas the highest price paid in the London market in 1897 exceeded the annual average by only \$0.049. In view of the close approximation of the total price of the refined product for that year to the total price of the mining product, it is very probable that the discrepancy in the valuation may be the result of an error in the quantity of the refined product. This error can not affect, however, the quantity given in this report, inasmuch as the same is derived from the total price of the mining product.

The figures for 1898 and 1899 were furnished to this Bureau, in advance of their official publication by the Norwegian Government, by United States Minister Thomas. His communication reads, in part, as follows:

In regard to the gold produced in the country during the year 1899, no information can be given, but it is supposed to be relatively insignificant.

At the Kongsberg silver works there was produced from July 1, 1898, to June 30, 1899, about 5,193 kilograms, fine silver, which was sold for 373,670.86 crowns. At other works, as far as is known, there has not been any regular production of any importance.

In the absence of any official figures for the calendar year the product for the fiscal year is used. The 5,193 kilograms of fine silver give a coining value of \$215,800, corresponding to 166,908 ounces, fine.

The silver production for the years 1897, 1898, and 1899 is presented in the following table, the figures for 1897 being derived from the commercial value as given by the Norwegian Central Statistical Bureau, and those for 1898 and 1899 from the fine weight given by Minister Thomas:

SILVER.

Years.	Fine weight.		Commercial value.	United States coining value.
	<i>Kilograms.</i>	<i>Ounces.</i>	<i>Crowns.</i>	
1897	6,444	207,126	464,000.00	\$267,800
1898	5,392	173,327	381,740.67	224,100
1899	5,193	166,908	373,670.86	215,800

PERU.

No official information has been received from Peru regarding the production of gold and silver for 1899.

This Bureau has heretofore arrived at its estimate by adding the coinage of Peru to the exports.

In 1898 the mint at Lima received for coinage 309.7 kilograms of fine gold, and for exportation 4.3 kilograms, a total of 314 kilograms, of a value of \$208,684.

There was exported during the year 1898, according to the *Estadística General de Aduanas*, published by the Peruvian Government:

Gold bullion—	Soles.
From Callao	18,000
From Mollendo	38,117
Gold ingots	6,196
Gold ores	700
Auriferous zinc (71.8 ounces)	2,481
Total	65,494

The imports of gold bullion during the same year amounted to 3,094 soles, leaving a balance of net exports of the value of 62,400 soles, equal, at the average rate of exchange on London, to \$27,953. Adding this to the value of the coinage, we obtain for the total value of the gold product \$236,637. This figure is about one-third of the value of the production of gold in Peru in 1897, as estimated by Señor Alejandro Garland, a Peruvian expert on financial and economic questions.

According to the estimate furnished by him to the United States minister at Lima, the gold product of 1897 was 945 kilograms, fine, of the value, in United States coin, of \$628,047. This estimate comes very near to the figures for 1898 given by the *Statistique de l'Industrie Minérale*, viz, 982 kilograms, fine, of the value of 3,382,000 francs, or \$652,557. Mines and Quarries, part 4, for 1898, likewise estimates the output of gold for the same year at approximately 1,000 kilograms.

In view of the practical agreement between these sources, the estimate furnished by Señor Garland for 1897 is accepted provisionally, until more accurate information will be available, as representative of the production of gold in Peru in preference to the estimates based on her exports.

According to the *Estadística General de Aduanas*, the values of refined silver and silver ores exported in 1898 were as follows:

	Soles.
Silver bars and native silver	3,581,131
Silver ore	3,141,199
Silver sulphides	1,296,261
Total	8,018,591

The preliminary figures furnished in 1898 by our minister were 507,588 soles, or only 6 per cent short of these final results.

This total does not include the indeterminable quantity of silver contained in copper bars and base-metal ores exported from Peru. The weights and values of these are given in the table below for reference:

Description.	Weight.	Value.
	<i>Kilograms.</i>	<i>Soles.</i>
Copper bars with contents of silver.....	781,024	822,613
Silver-lead ores.....	593,352	99,913
Argentiferous lead.....	266,177	65,485
Litharge.....	23,869	1,313
Total value.....		989,324

Making no allowance whatever for the value of the base metals, this would make an addition of 12 per cent only to the silver product. In reality it must be considerably less and may safely be disregarded.

The importation of silver bullion into Peru is prohibited. The mint has ceased the coinage of silver; but 1,600,000 soles of silver coin were officially stated to have been melted for export by the mint. This leaves a net export of new silver amounting to 6,418,591 soles.

Taking the sol at the average annual price of \$0.59 per ounce of fine silver as equivalent to \$0.4268, this would give a commercial value of \$2,735,174, which is equal to the value of 4,635,888 fine ounces, representing a coining value of \$5,993,875.

The coinage for 1898 was 120,000 soles, of a fine weight of 86,805 ounces and a coining value of \$112,200. Adding this to the total net exports, we obtain an estimated product of 4,722,693 ounces, or 146,892 kilograms of fine silver, of a coining value of \$6,106,075.

Mines and Quarries estimates the output of silver in 1898 at 165,000 kilograms, fine, and the *Statistique de l'Industrie Minérale* at 179,824 kilograms, fine, of a value of 17,623,000 francs. The range of variation between the three estimates is as wide as 22 per cent.

In the absence of information for 1899, the figures for 1898 are repeated.

According to official statistics in the archives of the old palace in Lima, the value of the silver produced in Peru between 1630 and 1803 was \$1,232,000,000. The mines of Hualgayoc, Huantajaya, and Cerro de Pasco alone yielded \$849,445,500 during that period.

Mines and Quarries, part 4, for 1898 says: "The amount of gold obtained from alluvial deposits and quartz veins is small.

"The lode of the Santo Domingo mine, in the province of Carabaya, yielded about 400 kilograms in the financial year 1898-99, but the means of communication are so difficult that the mineral resources of this rich auriferous district can not be properly utilized."

And regarding silver ore, it says elsewhere: "This is the principal mineral worked in Peru. The largest mines are at Cerro de Pasco. The output of silver has diminished considerably, on account of the drop in the price of that metal."

PORTUGAL.

There is little reliable information, if any, on the production of the precious metals in Portugal.

In years past this Bureau was informed that Portugal had neither gold nor silver mines. No official returns have been received for the production in 1899.

Mines and Quarries gives the production of gold for Portugal at 6 kilograms, and the *Statistique de l'Industrie Minerale* at 7, while both of these publications give the silver at 119 kilograms, fine. The gold product is taken at 7 kilograms, or 227 ounces, fine, corresponding to \$4,700. The silver product—119 kilograms, or 3,790 ounces, fine—gives a United States coining value of \$4,900.

The official publication of the Portuguese Bureau of Statistics, issued in 1900, gives the exports of gold bullion in 1898 as 233,080 milreis, and the imports as 3,400 milreis (*Commercio e Navegação Estatística Especial*, pp. xiv to xvii). This leaves a balance of net exports amounting to 229,680 milreis, and equivalent to \$248,054, which is over fifty times as much as the estimated production of Portugal.

The excess, amounting to \$243,354, of the net exports of gold bullion over the estimated production of gold must have proceeded from some Portuguese source, inasmuch as the imports given above include all the imports from Portuguese colonies.

A study of the imports and exports of gold coin and bullion to and from Portugal, which are officially stated from year to year, beginning with 1861 (*Commercio e Navegação*, p. cviii), discloses the following facts:

Since 1891 Portugal begins to export gold coin in large quantities. Of the thirty years preceding in only six her exports of gold coins exceeded her imports; during all the rest of the period her imports largely exceeded her exports. The net imports during the period from 1861 to 1890 aggregated 57,208,000 milreis; nearly all of this has been exported since 1891, the net exports aggregating 52,284,900 milreis. The movements of gold bullion did not follow those of gold coin during the same periods. Up to 1890 very little of gold bullion was either imported or exported, the total imports from 1861 to and including 1889 aggregating 27,000 milreis and the total exports 15,500 milreis. After the beginning of the outflow of gold coin the imports of gold bullion grew heavy, exceeding the exports within the four years, from 1892 to 1895, by 3,697,500 milreis. The exports during the same time remained insignificant and no bullion was exported in 1895. Within the last three years (1896 to 1898) the exports of gold bullion increase and exceed the imports, and 1898 is marked by the largest exports of gold bullion ever recorded in Portugal, while during the same year the outflow of gold coin, which began in 1891, was at its lowest ebb. In all there has been exported since 1891 416,600 milreis in bullion, or less than 1 per cent of the total gold exports within the same period.

All this goes to show that the exports of gold bullion had no necessary connection with the exports of gold coin, and further indicates that the practice of melting gold for export, if known at all, has been rather exceptional in Portugal and could not be safely accepted as an explanation of the growing exports of gold bullion.

It is possible, then, that the bullion was melted from old jewelry sold for the metal contained in it, which would, however, leave an open query as to the reason of the sudden growth of this traffic.

On the other hand, the increasing exports of bullion may be suggestive of a growing production of gold, obtained, possibly, as a by-product from silver or base-metal ores and not embraced within the figures given above.

RUSSIA.

The official figures of the actual production of gold and silver in Russia for 1899 are—gold, 33,354 kilograms, and silver, 4,196 kilograms. The returns state neither the fineness nor the value of these products. In the absence of such information they are assumed to be fine, as this Bureau asks in the questions submitted to foreign countries to have the same stated in kilograms, fine. The value of 33,354 kilograms, or 1,072,333 ounces, of fine gold is \$22,167,100. The coining value of the 4,196 kilograms, or 134,887 ounces, of fine silver is \$174,400.

THE PRODUCTION OF GOLD IN RUSSIA.

[From the Russian Journal of Financial Statistics, 1900, pp. 17-29.]

The statistics published in foreign countries on the production of gold in Russia sometimes show very serious differences; and yet they are taken from the same sources. Their contradictions proceed from the fact that dissimilar quantities are added together—gold dust (schlich gold) to bars; kilograms of base bars to bars expressed in kilograms of gold chemically pure; gold received to gold sent off, etc. In order to avoid this confusion it is necessary to attach very precise meanings to the words used.

A. Production.—Quantities obtained on the spot by washing or by pulverizing gold dust; wash gold (having the appearance of small, blackish crystals) of unknown fineness and the yield of which in fine gold approximates to eight-ninths. Alluvial or wash gold always contains a notable proportion of silver.

B. Statements of the refineries.—(1) Quantities melted. The gross weight of the bars (the average fineness fluctuates about the figure 0.910). (2) Quantity of gold chemically pure contained in these bars (saving ulterior verifications at the St. Petersburg mint). In the total of these statements the quantity of gold contained in the silver bars of domestic production (the product of Russian silver and argentiferous lead mines) is included.

C. Arrivals at the mint of St. Petersburg (where all the gold produced in the Empire is finally deposited).

D. Outgoings from the mint.

A.—PRODUCTION, PROPERLY SO CALLED.

Quantities of gold obtained by washing (placer gold), and by crushing (lode gold).—These quantities, inscribed day after day, without correction, alteration, or erasure, in the registers of the workings (at the very places of production), can not be expressed in fine gold for the very simple reason that the results of the assay can be known only after the gold dust sent off by the producers is melted into bars at the Government refineries, and that this or that lot of bars may contain dust gathered during different calendar years.

There are hundreds of workings in Russia, scattered over an immense area, whose annual production scarcely reaches a few ounces. It is clear that the proprietors of these small workings do not carry their gold to one of the three Russian refineries (there are only three) as market gardeners carry their asparagus to market.

As a rule, the average fineness of this dust approximates to eight-ninths, with very notable differences between one sample and another. It is, therefore, utterly impossible to know exactly how much fine gold Russia produced from the 1st of January to the 31st of December of any given year.

The production, properly so called, may be expressed only: (a) To within an ounce, and only in gold of a hypothetical degree of fineness; (b) in fine gold, to only a hypothetical total.

We here give for the nine years 1890-1898 the weight, within an ounce, of the gold dust produced in all points of the Empire, including Finland:

GOLD DUST OF AN UNKNOWN DEGREE OF FINENESS.

Year.	Kilos.	Ounces.	Year.	Kilos.	Ounces.
1890.....	39,372.579	1,265,858	1895.....	41,110.651	1,321,738
1891.....	39,088.133	1,256,712	1896.....	37,211.224	1,196,368
1892.....	43,000.799	1,382,510	1897 ^a	38,098.986	1,224,911
1893.....	44,869.249	1,442,580	1898 ^a	38,436.572	1,235,764
1894.....	42,942.810	1,380,643			

^a An approximative figure. For the years 1890-1896 the figures are exact to within an ounce.

To anyone who wishes to understand the movement of the production of gold in Russia these are the only figures to be taken into consideration. All other figures—the statements of the refineries, the deposits at the mint, and the outgoings from the mint—doubtless depend on the total production, but they do not show with sufficient sensibility its progress, its stationary or retrograde condition.

If one absolutely desired to form an idea of the amount of the production, properly so called, expressed in gold 1,000 fine, one might admit as approximating to the truth the following valuation:

VALUATION IN FINE GOLD OF THE PRODUCTION, ASSUMING AN AVERAGE FINENESS OF EIGHT-NINTHS.

Year.	Gold 1,000 fine.		Year.	Gold 1,000 fine.	
	Kilograms.	Ounces.		Kilograms.	Ounces.
1890.....	34,997.848	1,125,207	1896.....	33,076.644	1,063,438
1891.....	34,745.007	1,117,078	1897.....	33,865.766	1,088,810
1892.....	38,222.932	1,228,896	1898.....	34,165.842	1,098,457
1893.....	39,883.776	1,282,293	Nine years.....	323,672.001	10,406,296
1894.....	38,171.386	1,227,239			
1895.....	36,542.800	1,174,878			

B.—GOLD CHEMICALLY PURE (1,000 FINE).

Statements of the refineries during the last sixteen years.—Expressed in fine gold (1,000 fine) the quantity of domestic gold dust melted in the refineries of the Empire during the period 1883–1898 represent the following totals:

Year.	Kilograms.	Ounces.	Year.	Kilograms.	Ounces.
1883.....	30,272.815	973,294	1891.....	34,800.502	1,118,862
1884.....	30,775.200	989,446	1892.....	37,964.669	1,220,592
1885.....	28,138.251	904,666	1893.....	39,684.010	1,275,870
1886.....	28,173.303	905,792	1894.....	37,886.608	1,228,083
1887.....	31,087.946	999,501	1895.....	36,414.165	1,170,742
1888.....	31,491.967	1,012,492	1896.....	32,605.182	1,048,281
1889.....	33,130.955	1,065,185	1897.....	33,201.627	1,067,457
1890.....	35,310.883	1,135,271	1898.....	33,422.071	1,074,544

These totals include the quantity of gold contained in the bars of silver coming from the melts in the Russian refineries of domestic silver ores and argentiferous lead.

COMPARISON OF THE FIGURES A AND B.

Let us now set opposite each other, for the nine years 1890–1898, the statements of the refineries, expressed in gold 1,000 fine, and the valuations above given of the production, expressed in gold 1,000 fine.

Year.	Kilograms of fine gold.		Ounces of fine gold.	
	Production.	Statements.	Production.	Statements.
1890.....	34,997.848	35,310.883	1,125,207	1,135,271
1891.....	34,745.007	34,800.502	1,117,078	1,118,862
1892.....	38,222.932	37,964.669	1,228,896	1,220,592
1893.....	39,883.776	39,684.010	1,282,293	1,275,870
1894.....	38,171.386	37,886.608	1,227,239	1,228,083
1895.....	36,542.800	36,414.165	1,174,878	1,170,742
1896.....	33,076.644	32,605.182	1,063,438	1,048,281
1897.....	33,865.766	33,201.627	1,088,810	1,067,457
1898.....	34,165.842	33,422.071	1,098,457	1,074,544

The figures for 1890, 34,997.848 and 35,310.883, represent a difference of 313.035 kilograms (10,064 ounces), while those for 1896, 33,076.644 and 32,605.182, differ by 471.462 kilograms (15,157 ounces). When one has to do with a commodity worth 664.61 per kilogram, a confusion of the figures A and B present some inconveniences.

C.—DEPOSITS AT THE MINT.

All the gold produced in the Empire, Finland excepted (the production of Finland fluctuates between 4 and 5 kilograms per annum), goes through the refineries of Ekaterinburg, of Tomsk, and of Irkutsk, in which the statements above given are prepared, after which, when each refinery possesses a sufficient stock (\$2,000,000 at least, which requires a certain time to accumulate), it sends it to the mint at St. Petersburg, the only one in Russia. At the present day the journey from Ekaterinburg or from Tomsk is not very long, but it must not be forgotten that the trans-Siberian Railway dates only from yesterday. However, the packing, transportation, unpacking, verification, entering on the registers, etc., requires such a considerable time

that concordance is impossible, for any given calendar year, between the statements of the refineries and those of the mint.

COMPARISON OF THE FIGURES A, B, AND C.

Year.	Gold of domestic production (kilograms of fine gold).			Fine ounces.		
	Production.	Statements of the refineries.	Deposit at the mint.	Production.	Statements of the refineries.	Deposit at the mint.
1890	34,997.848	35,310.883	31,841.290	1,125,207	1,135,271	1,023,721
1891	34,745.007	34,800.502	36,348.725	1,117,078	1,118,862	1,168,639
1892	38,222.932	37,964.669	35,602.218	1,228,896	1,220,592	1,144,638
1893	39,883.776	39,684.010	38,382.021	1,282,293	1,275,870	1,234,010
1894	38,171.386	37,886.608	36,312.791	1,227,239	1,228,083	1,167,483
1895	36,542.800	36,414.165	43,478.329	1,174,878	1,170,742	1,397,861
1896	33,076.644	32,605.182	32,404.618	1,063,438	1,048,281	1,041,833
1897	33,865.766	33,201.627	34,977.072	1,088,810	1,067,457	1,124,538
1898	34,165.842	33,422.071	38,313.212	1,098,457	1,074,544	1,231,799
Nine years.....	323,672.001	321,289.717	327,660.276	10,406,296	10,339,702	10,534,522

Here for one and the same year (1895) the difference exceeds 7,000 kilograms, or a value of more than \$4,600,000.

GOLD PRODUCTION: (1) IN DUST; (2) IN FINE GOLD—STATEMENTS OF THE REFINERIES AND DEPOSITED AT THE MINT (FINE GOLD).

[A, production expressed (1) in dust (about eight-ninths fine), (2) in gold (1.000 fine); B, statements of the refineries (fine gold), and C, deposits of domestic gold (expressed in fine gold) at the mint of St. Petersburg. Authentic figures, exempt from error.]

Year.	A.—Production stated on the spot and expressed in—		B.—Statements of refineries, inclusive of gold contained in silver ore. <i>a</i>	C.—Deposits at the mint (domestic gold).
	Gold dust (eight-ninths fine).	Fine gold (1.000 fine).		
	Kilograms.	Kilograms.	Kilograms.	Kilograms.
1870	35,325.837	31,400.744	.....	32,059.039
1871	39,312.295	34,944.262	.....	35,839.436
1872	38,179.219	33,937.084	.....	34,857.320
1873	33,166.131	29,481.005	.....	34,248.652
1874	33,205.098	29,515.643	.....	29,480.821
1875	32,691.155	29,058.805	.....	30,955.966
1876	33,647.037	29,908.477	.....	42,636.957
1877	<i>b</i> 41,200.293	<i>b</i> 36,622.470	.....	36,852.145
1878	42,132.418	37,451.038	.....	38,151.111
1879	43,109.190	38,319.280	.....	38,001.186
10 years	371,963.673	330,638.808	.....	353,082.633
1880	43,272.710	38,464.631	.....	38,588.516
1881	<i>b</i> 36,760.035	<i>b</i> 32,675.587	.....	17,245.975
1882	36,155.917	32,138.593	.....	20,299.176
1883	35,748.188	31,776.167	30,272.815	29,421.567
1884	35,684.044	31,719.150	30,775.200	38,499.716
1885	33,015.981	29,347.539	28,138.251	37,036.291
1886	33,450.652	29,732.914	28,173.303	30,872.528
1887	34,858.606	30,985.427	31,087.946	30,232.900
1888	35,163.612	31,256.545	31,491.967	32,052.909
1889	37,257.336	33,117.632	33,130.955	34,868.853
10 years	361,367.081	321,215.185	.....	309,118.431
1890	39,372.579	34,997.848	35,310.883	31,841.290
1891	39,088.133	34,745.007	34,800.502	36,348.725
1892	43,000.790	38,222.932	37,964.669	35,602.218
1893	44,869.249	39,883.776	39,684.010	38,382.021
1894	42,942.810	38,171.386	37,886.608	36,312.791
1895	41,110.651	36,542.800	36,414.165	43,478.329
1896	37,211.224	33,076.644	32,605.182	32,404.618
1897	38,098.986	33,865.766	33,201.627	34,977.072
1898	38,436.572	34,165.842	33,422.071	38,313.212
9 years	364,130.994	323,672.001	321,289.717	327,660.267

a Notwithstanding all our research, we have not been able to find the figures of the period 1870–1882.
b An imperial decree of November 10, 1876, had abolished the duties collected in favor of the State on gold; hence the sudden increase of the production. When the duties were restored the production decreased no less rapidly and almost to the same extent.

THE PRODUCTION OF GOLD IN RUSSIA DURING THE THIRTEEN FIVE-YEAR PERIODS
1816-1880 AND DURING THE EIGHTEEN YEARS 1881-1898.

[The quantities below are expressed, up to 1860, in bars and of average fineness of about eleven-twelfths, and beginning with 1861, in gold dust (schlich gold of the fineness of about eight-ninths).] *a*

Five-year periods.	Eleven-twelfths fine.	Five-year periods.	Eleven-twelfths fine.
	<i>Kilograms.</i>		<i>Kilograms.</i>
1816-1820	1,383.844	1851-1855	123,676.840
1821-1825	10,326.674	1856-1860	133,172.511
1826-1830	24,181.810		
1831-1835	33,297.453	Total	584,425.896
1836-1840	37,602.247	Gold 1.000 fine	535,724.000
1841-1845	88,193.000	Annual average expressed in gold	
1846-1850	132,591.515	1.000 fine	11,905.000

Five-year periods and years.	Eight-ninths fine.	Five-year periods and years.	Eight-ninths fine.
	<i>Kilograms.</i>		<i>Kilograms.</i>
1861-1865	120,403.710	1890	39,372.579
1866-1870	150,896.720	1891	39,088.133
1871-1875	176,553.896	1892	43,000.799
1876-1880 <i>b</i>	203,361.647	1893	44,869.249
1881	36,760.035	1894	42,942.810
1882	36,155.917	1895	41,110.651
1883	35,748.188	1896	37,211.224
1884	35,684.044	1897	38,098.986
1885	33,015.981	1898	38,436.572
1886	33,450.652		
1887	34,858.606	Total	1,333,441.347
1888	35,163.612	Gold at 1.000 fine	1,185,281.197
1889	37,257.336	Annual average in gold 1.000 fine ..	31,191.610

a The figures of the two five-year periods 1861-1865 and 1866-1870 are approximative (to about 1 Russian pound); those of the years 1871-1896 are exact to nearly 1 gram.

b The figures of the two five-year periods 1871-1875 and 1876-1880 differ by about 550 kilograms from those of an official statement of the department of mines (made for the Chicago Exposition, 1893). However, we have reason to consider them strictly correct.

PRODUCTION OF SILVER IN RUSSIA.

1.—Silver obtained from the treatment of silver ores and argentiferous lead ores.

Five-year periods.	Quantities of silver of unknown fineness (about 0.910) expressed in—		Five-year periods.	Quantities of silver of unknown fineness (about 0.910) expressed in—	
	Kilograms.	Ounces.		Kilograms.	Ounces.
1822-1825	74,367.452	2,390,969	1861-1865	86,157.723	2,770,035
1826-1830	94,679.267	3,044,009	1866-1870	81,451.095	2,618,712
1831-1835	104,199.611	3,350,095	1871-1875	57,479.160	1,847,998
1836-1840	99,153.599	3,187,862	1876-1880	55,334.135	1,779,033
1841-1845	97,968.880	3,149,772	1881-1885	44,735.544	1,438,281
1846-1850	93,218.127	2,997,032	1886-1890	72,217.613	2,321,851
1851-1855	85,781.791	2,757,948	1891-1895	50,107.937	1,611,007
1856-1860	86,915.731	2,794,405	Year 1896	7,812.814	251,187

Expressed in silver (1.000 fine) the above quantities amount to a total of 1,081,000 kilograms, or an annual average of less than 15,000 kilograms.

2.—Silver contained in the bars obtained by melting gold dust.

The gold dust contains nearly one-eleventh of fine silver. The production of gold dust during the years having been about 1,840,000 kilograms, we may assume for this period a total of 167,000 kilograms obtained from the refining of gold.

The grand total of the seventy-five years 1822-1896 must have approximated 1,250,000 kilograms of fine silver. This is about one-fourth of the world's production of silver in one year at the present time.

DOMESTIC SILVER—SILVER OBTAINED FROM SILVER ORE AND ARGENTIFEROUS LEAD ORE—SILVER CONTAINED IN DOMESTIC GOLD—STATEMENTS OF THE REFINERIES.

Year.	Silver chemieally pure obtained from—		Total.	Year.	Silver chemieally pure obtained from—		Total.
	Silver ores and argen-tiferous lead ores.	The refin-ing of gold.			Silver ores and argen-tiferous lead ores.	The refin-ing of gold.	
	<i>Kilos.</i>	<i>Kilos.</i>	<i>Kilos.</i>		<i>Kilos.</i>	<i>Kilos.</i>	<i>Kilos.</i>
1833	6,748.354	2,944.803	9,693.157	1891.....	(?)	(?)	(?)
1884	8,641.940	3,755.228	12,397.168	1892.....	10,271.697	3,416.459	13,688.156
1885	8,799.602	2,395.238	11,194.840	1893.....	8,813.526	3,645.377	12,458.903
1886	12,491.766	2,476.526	14,968.292	1894.....	6,432.927	3,547.401	9,980.328
1887	14,362.215	2,722.234	17,084.449	1895.....	7,227.074	3,529.791	10,756.865
1888	13,490.157	2,801.064	16,291.221	1896.....	7,170.288	3,230.233	10,400.521
1889	12,662.123	2,935.384	15,597.507	Total, last 5 years..	39,915.512	17,369.261	57,284.773
1890	13,535.614	3,040.936	16,576.550				
Total.....	90,731.771	23,071.413	113,803.184				

The Altai region alone snpplies more than two-thirds of the above quantities. Silver has been worked there since 1745.

One hundred and thirty years ago Russia reached its maximum, nearly 30,000 kilograms (4 or 5 per cent of the world's production at that time). At present Russia furnishes scarcely more than one-fourth or one-fifth of 1 per cent (one four-hundredth or one five-hundredth) of the world's production.

MINERAL RESOURCES OF SIBERIA.

[Consular Report No. 241, October, 1900, pp. 229 to 232.]

Commercial Agent Greener sends from Vladivostok translation from a recently published book by Baron de Batz, giving information about the gold-bearing strata, climate, etc., of Siberia, as follows:

GOLD-BEARING STRATA.

I.—*The territory within the jurisdiction of the Tomsk mining office.*

In the mining districts of Tomsk, Tobolsk, Akmolinsk, Semipalatinsk, and Semire-chensk gold is to be met with in the tributaries of the Ob. Now diggings are confined to the affluents of Lake Zaissan and the Narin and Black Irkutsk rivers and to the affluents of Lake Esseh-Kone and Balkash and the Kopalsk. In the Akmolinsk operations are centered in the locality of Kokehetavsk.

II.—*The territory under the Irkutsk mining office.*

In the maritime province there is one group of concessions in the basin of the Amur and another on the island of Askold. Here the sea bed, which consists of auriferous sand, is worked in a perfunctory way. Among the affluents of the Amur important from the point of view of gold production the river Amgoun and the Tumen must be noticed, as well as the Semi, the Nemilen, etc.

The gold workings of the Amur constitute four groups, distributed for the most part over the left tributaries of the Amur River.

In West Transbaikalia diggings are confined to the affluents of the Chikoi, a tributary of the Selenga, which empties into the Baikal, a tributary of the Yenisei.

The Lena mining district comprises the region traversed by the lesser hills of the Yabloni Mountains.

The virgin-forest zone in Siberia, which abounds in bogs and swamps, impenetrable except in winter when the ground is frozen, has a series of river and torrent systems, which may for purpose of general classification be called (a) the Podkam-mennaya-Toungouska system, (b) the Great Pit system, and (c) the system of the Yenisei and its tributaries. The Great Pit forms the boundary between the north and south districts.

In the Lena district the gravel is very poor and difficult to work. The district of Biruginsk is the poorest locality within this jurisdiction, although at one time it occupied the foremost place in Siberia as a gold-producing district.

III.—*The territory of the cabinet of His Majesty.*

In the district of the Altai gold is worked on tributaries of the Ob. The placers on the left bank of the Tom are worked by the companies of St. Petersburg with the special permission of the Czar. The right bank is free, and diggings are to be found on the river Tom, Alkan Choulichman, Upper Katoun Boukhtarma, etc.

From this summary it will be seen that the auriferous area extends over the slope of the mountain ridge which, rising from the steppes of Turkestan and dying away as it skirts the Sea of Okhotsk, traverses obliquely the Asiatic continent from southwest to northeast. From the meridian of Tobolsk to the Pacific the range is about 4,300 miles long, with an average breadth of nearly 400 miles and an area over 1,600,000 square miles. This country has only been superficially prospected, because roads are lacking and it is impossible to penetrate these primeval Siberian forests in summer, and to prospect in winter, when every outcrop and surface indication is buried beneath the snow, is not an inviting or profitable undertaking.

The work of Government exploration in the eastern portion has not proceeded beyond the sixty-second degree of latitude, although the existence of a very rich auriferous vein is known in the mountains, between the Lena and the Ayan.

THE GENESIS OF SIBERIAN PLACERS.

The Siberian placers are situated on the north and northeast of the great mountainous plateau described.

This vast plain, intersected by important rivers—the Wenga, Angara, Yenisei (nearly 3,000 miles long), the Ob (over 2,600 miles), the Lena (more than 2,000 miles), and the Amur (2,600 miles)—still shows traces of great glacial activity. The origin of the Siberian placers, judging from researches made in other parts of the world—the United States, Australia, Europe—may be accounted for as follows:

The Silurian or Devonian mud, on account of the auriferous pyrites it contains, most competent geologists agree in regarding as the almost universal source of gold. This was upturned at the period of the formation of the Asiatic ridge, and at the same time was fissured and broken. The fissures, filled with quartz and pyrites torn from the schist by the action of the waters, became the veins already found. Subsequently the powerful action of the Glacial period gave rise to the placers which are now being worked.

If this theory of the formation of auriferous alluvia, which has been verified in the other great gold-producing countries, proves true of Siberia also, then it is to the south of the localities at present worked that a systematic search for the primitive strata ought to be carried out.

It is already known that the Altai contain veins of lead, silver, and copper; numerous specimens of all kinds of minerals have been brought from that region by hunters and foresters. It is in these hills, with their westerly continuations, and in the mountainous mass which strikes out from Manchuria in a northeasterly direction that the wealth of Siberia must be sought.

The chain of the Khingan, "Mountain of Gold," is said to be rich in minerals, and it is doubtless from these hills and their spurs that the gold in placers of the Ussuri and the Amur (lower portion) was brought.

The same reasoning holds good for the hills bordering on the Sea of Okhotsk.¹

PECULIARITIES OF SIBERIAN PLACERS.

The great extent of the regions covered with auriferous alluvia in Siberia is undoubtedly the primary cause of the difficulty experienced in examining them systematically. The impenetrable virgin forests at the north, with their luxurious vegetation, fallen trees, and, above all, marshy soil, prove an obstacle to geological research. It is impossible, in the majority of cases, to follow the different strata, recognize outcrops, or ascertain the nature of the subsoil.

It was not until 1886 that the want of a school of geology at Irkutsk made itself felt, although as far back as the year 1843 the department of mines had sent Colonel Hofman to Siberia to study the gold deposits.

The information obtainable on the subject of Siberian placers is consequently scattered through a great number of monographs, and until the geological committee of the Great Siberian Railroad publishes the result of their labors, it will be difficult to

¹ NOTE BY CONSUL.—In the latter region prospecting made in 1899 has already demonstrated the correctness of the deduction. An American company of geologists, under the lead of Prof. G. Frederick Wright, daily expected here, will doubtless make many additions to the present data concerning Siberia's hidden wealth.

treat the subject comprehensively. In contrast with the great strata of the Rocky Mountains in California and in British Columbia, which belong to the Pre-Tertiary period, as attested by the volcanic matter with which they are covered, the alluvia of Siberia belong to the Quaternary epoch and are of recent formation.

Siberian placers are situated in valleys having usually a gentle fall and often marshy. Their distinctive feature is that the pay gravel above the bed rock is covered, in the immense majority of cases, with an unproductive layer of soil.

Auriferous localities are also generally characterized by the presence of low, rounded hills, testifying to the intensely destructive action of the atmospheric agents upon the rocky conformation of the country. The placers are found at a moderate altitude above sea level. In the Urals they are met with at a height varying from 500 to 1,000 feet; in the Alatau Mountains, at 2,000 feet; in the valley of the Olekma, from 2,000 to 2,500 feet; and in the Yenisei, from 2,500 to 3,000 feet.

In addition to native gold, frequently found in nuggets, iron pyrites, often in the form of mispickel, and all the products of its decomposition, such as magnetic oxide, limonite, hematite, etc., are met with in Siberian gravels.

Copper is found, sometimes native, sometimes in the form of copper pyrites. Lead has been discovered as sulphate, carbonate, phosphate, or sulphuret.

Native bismuth has been found in the valley of the North Yenisei and in certain valleys of the Altai.

Among hard stones, garnets, rutile, tourmaline, zircon, peroxide of tin, etc., are found.

The organic remains are most generally those of the mammoth. In 1840 it was calculated that more than 2,000 of these animals were found; some with portions of their bodies still soft were discovered in the frozen clays of the extreme north. The woolly rhinoceros (*Rhinoceros tichorinus*) is also frequently met with.

The state of preservation of these mammoths—animals which required abundant vegetation—indicates in a striking fashion the rapidity with which the Glacial period must have enveloped the vast plains of Siberia.

Human remains have also been found—a skull at a depth of 10 feet in the Chtogolev mine in 1860—ancient hearths; also a stone slab, with inscriptions, in a mine in the basin of the Kigas.

A feature altogether peculiar to the Siberian placers, especially those in the district of the Lena, Zeya, etc., is that the soil remains perpetually frostbound or thaws only slightly in the summer time. Near the sources of rivers places are found not frozen; these are said to be caused by warm or tepid springs beneath the surface of the earth.

HISTORY OF WORKING.

The working of Siberia gold mines dates back only to the middle of the eighteenth century, at which period the first auriferous veins were discovered in the Urals and in the government of Archangel. Gold was discovered in the Ural Mountains in 1744. Several veins situated on the banks of the river Beregofka were worked with varying success from 1800. In 1895 the output was 19.46 poods (703 pounds). In the southern Urals the first gold reef was discovered in 1799. The Kothkar reef yielded in 1894 about 85 poods (3,069 pounds).

Toward the close of the period 1870–1879 reefs were discovered in the government of Yenisei and the province of Transbaikalia. In 1894–95 gold-bearing strata were found in the district of Mariinsk, in the government of Tomsk.

In 1866 the Amur Province was opened to private trade; two years later mining was begun on the concessions belonging to the Upper Amur Mining Company, in the basin of the Djalinda. At the same period explorations were set on foot in the Maritime Province, and in 1871 the first gold was taken from mines belonging to a Mr. Yetukof, in the basin of the Amgoun. During the season of 1897 the Amgoun Mining Company treated 10,834 cubic sagens of gravel, from which about 55 poods of gold were extracted, giving an average of 7.825 grams to a cubic meter. On the other hand, the Amur Mining Company took out of their placers 20½ poods (734 pounds), showing an average of more than 17.06 grams to a cubic meter.

Mr. Greener adds: "In 1896 the Government dispatched to the shores of the Sea of Okhotsk an expedition which, according to the latest news, has found rich alluvial drifts. There have recently arrived at this port, direct from the United States, six practical American miners, under the auspices of the Russo-Chinese Bank. They are supplied with modern machinery, are men of experience, and go to the Yumen, where rich discoveries are reported. These are the 'original forty-niners' of the 'new California,' and it is hoped they will give new impetus to mining in the Maritime Province. In conversation with one of them who, last winter, prospected in the Yukon, Alaska, the idea was emphasized that the whole region about Anadirski and the extreme eastern range of the Stanovoi Mountains, near Bering Straits, would prove as rich as the Cape Nome region, since it was of analogous formation."

MINING IN SIBERIA.

[Consular reports, April 11, 1900.]

This consulate is in receipt of a number of letters by each American mail, from all parts of the United States, inclosing newspaper articles which say that a Russian engineer has recently made a report to his Government, stating that the same gold belt which has proved so rich at Cape Nome, Alaska, extends across the Bering Sea into Siberia, and that there are enormously rich quartz lodes in gold mines all over Russia, which are easy to work at a great profit, are owned by the Government, and will be sold to the highest bidder. It is also stated that the Emperor has issued an ukase permitting Americans to prospect for gold on the west coast of Siberia, and that preference is given to American miners and capital to explore the mineral wealth.

These letters inquire as to the truth of these statements, for copies of Russian mining laws, and permits to prospect for gold in Russia, as numerous parties are organizing to take immediate advantage of this opportunity.

I called on N. A. Denissoff, the director of the mining department, yesterday, stated the substance of the articles, and he replied that, although the Government was taking steps to ascertain the conditions on the east coast of Siberia, the Emperor had not issued an ukase on that subject, nor was it probable that he would do so. He said that petitions might be made to the Emperor for permission to prospect for minerals in any part of Russia, which should be accompanied by recommendations as to the character of the applicant, his experience as a mining engineer, capital to be employed, etc., and it would be considered; but the best-informed people here do not believe permits could be obtained to prospect for gold on the east coast of Siberia until after the Russian Government has fully investigated its conditions. Were it ready to consider such applications, the probabilities are that it would require from two to three years before the same would be finally decided. Russian officials place no value on time, and it requires from two to twelve weeks to receive an answer to an official communication from the various departments, according to the work involved in the reply.

The value of Russian gold mines has been greatly exaggerated. Several experienced American mining engineers, who are admitted to be the best in the world, have visited Siberia in the interests of English as well as American capitalists during the past three years and made extensive examinations of the conditions, and I have not heard of a single company being organized as a result of their reports. The mining is almost all placer, there being but two small quartz mines in the Ural Mountains, which are owned by French capitalists and are said to be losing money.

There is very little foreign capital in Siberia. No advantages are offered to or discriminations made in favor of Americans engaging in any kind of business in Russia.

W. R. HOLLOWAY, *Consul-General*.

ST. PETERSBURG, *February 13, 1900.*

MINING INDUSTRY IN SIBERIA.

[Consular Report No. 239, August, 1900, pp. 492-494.]

Mining of all kinds in Siberia has hitherto been beset with so many difficulties as to discourage operators, native or foreign. The concession to an American—D. M. Clarkson—to mine for gold or coal on his own account without the usual adjunct of a Russian partner seems to point to a more liberal policy. Still, there are restrictions. Mr. Clarkson and Mr. Emery, the latter the pioneer American merchant of Siberia—who has also been granted special privilege by imperial rescript—can not enter into combination with any existing company nor operate any but new claims, and even then work must be done under disadvantages which would be hardly tolerable to ordinary American prospectors. For example, one must have special permits from local authorities for felling trees and constructing roads, and there are certain rules to be followed when minerals other than those specified in the grant—as copper, iron, etc.—are found.

The mineral wealth of this region has been for years practically untouched. Chinese have worked the auriferous sand on a small scale, and even now they are thrashing over the old material with minimum success. The complaint has been that there was no capital to develop the mineral deposits, yet within four years Belgian, English, French, and American experts have visited Siberia, examined the various districts, and advised the formation of companies for the exploitation of mines; but prudent foreign companies withheld the capital, mainly because of the governmental restrictions.

An American mining engineer who has spent two years in Siberia is impressed with the mineral resources of all eastern Siberia from Lake Baikal to the new diggings opposite Cape Nome and also in Manchuria.

The quartz gold mines on Askold Island, near Vladivostock, are owned by a Russian firm and have been worked for two years with gratifying results. In 1897 the gold was first discovered; in 1898-99 prospecting was begun; in the spring and summer of 1899 500 tons were extracted with poor machinery, the estimated value being \$25,000. Some thirty-odd tunnels have been prepared, and the managers hope to obtain this year 3,000 tons of valuable quartz, worth perhaps \$150,000, and about 9,000 tons of quartzite. They anticipate from the prospecting of 1900 some \$50,000 to \$75,000 clear profit. The gentlemen in charge of this mine are old residents, naturalized subjects, and cautious business men.

Either the announcement of the concessions to Messrs. Emery and Clarkson or the stories emanating from travelers in Siberia have caused many inquiries to be sent to this agency as to the chances for mining in this locality. These inquiries come from Cape Nome, the Klondike, and the Pacific coast generally, and in most cases could be answered only at St. Petersburg. It is true the Imperial Government invites all foreign capital to enter its territory for mining or manufacturing purposes, but restrictions are severe. With regard to gold-mining privileges the applicant must make petition in person here, or he may go to St. Petersburg if more convenient. In the latter case the imperial authorities would refer the matter to the governor-general here before deciding the case. In no instance would such a permit be hastily granted, and an applicant without references as to character and ability to carry out his plans would undoubtedly be rejected. To land on the soil of the Maritime Province and proceed on one's own account might subject the prospector to murder or robbery on the part of wandering convicts or hostile natives. The Government also exercises strict espionage in matters of passports, permits, etc., and there is a high tax on smelting and conveyance from the mine to the Government office.

The following paragraph has appeared in American newspapers:

"From Port Arthur this summer (1899) several Americans have gone into Manchuria to prospect for gold, and as the Russian Government advances money to bona fide miners and buys the entire output of the gold mines, there is some degree of stability in the venture."

Nothing could be more misleading than such statements. The Russian Government does not yet profess to own Manchuria. It advances no money to miners or manufacturers of any kind, except to those coming within the scope of its administrative policy. It does assist immigrants after they have arrived, but does not pay their way. It buys the output of all mines on broad grounds of governmental policy, as it controls mining business of whatever character. But this fact would afford little "stability" to the venture of any American who came to Manchuria or the Maritime Province to engage in mining without a special permit or a Russian partner or a good supply of capital and abundant machinery.

SIBERIAN MINING CONCESSION.

[Consular Report No. 239, August, 1900, p. 491.]

The following note has been received by the Department from the Russian embassy:

WASHINGTON, *May 1-14, 1900.*

MR. SECRETARY OF STATE: The question of gold mining on the Russian Pacific coast has called forth numerous inquiries addressed both to the imperial embassy and to the Russian consulates in this country by citizens of the United States who are desirous of participating in the exploitation of the mineral wealth in Russian territory. Erroneous views have arisen in this connection, which it is my duty, in the interest of our two Governments and for the prevention of any misunderstanding, to rectify.

The Imperial Government granted, under date of the 11th ultimo, the exclusive right to exploit the mineral wealth in the peninsula of Tchoukotsk to Colonel Von-liarliarsky, of the Russian Guards. This gentleman has organized an expedition under the direction of Mr. Bogdanovitch, a mining engineer, which sailed from Russia April 18-May 1, for the peninsula of Tchoukotsk via the United States.

According to information which I have received from various quarters, numerous gold seekers propose to come from Alaska in the course of the year to the Russian territory to which the aforesaid Russian expedition is bound, which expedition, as I have already had the honor to inform your excellency, is alone authorized to carry on mining operations in the country.

In apprising you, Mr. Secretary of State, of the measure adopted by the Imperial Government, whereby the exclusive right to exploit the gold-bearing lands and others

is conferred upon Colonel Vonliarliarsky, I have the honor to beg you to bring this measure to the notice of the United States authorities that are interested, with a view to the avoidance of regrettable misunderstandings.

I have, etc.,

Ct. CASSINI.

BRIEF ACCOUNT OF THE RESULTS OF THE SEARCHING AND PROSPECTING FOR GOLD CARRIED OUT BY THE OKHOTSK-KAMCHATKA EXPEDITION ON THE NORTHWESTERN SHORE OF THE SEA OF OKHOTSK.

[Drawn up by Mr. Bogdanovitch, M. E., head of the Okhotsk-Kamchatka expedition. Consular Report No. 233, February, 1900, pp. 172, 173.]

In consequence of the information existing as to the occurrence of gold on the shore of the sea of Okhotsk, the ministry of agriculture and state domains, in accordance with the statute of the committee of the Siberian Railway which received the imperial sanction on the 13th of May, 1895, organized a special expedition to investigate the auriferousness of the shores of the sea of Okhotsk, of the coast of Kamchatka, and of the Shantar Islands, where, in case of the discovery of workable gold deposits, their development by private enterprise might be expected. This expedition, organized and equipped by Mr. Bogdanovitch, M. E., continued its explorations for three years, embracing the extensive stretch of coast about the sea of Okhotsk from Nikolaievsk, on the Amur, to Okhotsk, and the whole western shore of the peninsula of Kamchatka. The results of the labors of the expedition justified the hopes placed upon it, as the preliminary search, combined with the detailed geological exploration of the regions traversed, proved the presence of gold in many river valleys between the left bank of the river Udá and the former port of Ayan. After the discovery of the existence of gold subsequent prospecting was directed to the location of the auriferous beds and the determination of the percentage of gold contained in them. More detailed prospecting, by which the total quantity of the precious metal is determined, did not form part of the object of the expedition, as requiring a more prolonged and exhaustive examination of certain localities.

The labors of the expedition proved the undoubted importance as regards richness in gold of the ridge or belt of mountains lying between the Jugjur watershed (Stanovoy Range) and the elevations along the coast. The presence of gold in various river valleys and the relation of these valleys to the said belt of mountains justify the distinguishing of six regions in the country explored, which embrace seven different river systems, presenting data encouraging further search for gold.

(1) *The systems of the rivers Aldamá and Ui.*—The preliminary exploration of the system of the river Aldamá was carried out under unfavorable conditions in winter and spring. Samples taken from the slope sides showed only the presence of gold gravels with coarse magnetite, in the main situated along the streams in the belt between Jugjur and the shore ranges. Along the river Ui, belonging in its upper course to the same belt of mountains, was discovered a thin stratum of dense sand with slight signs of gold.

(2) *The system of the River Lantár.*—Here preliminary exploration showed the presence of gold alike in the main valley of the Lantár and along its tributaries and smallest affluents in various spots, nine in number. Prospecting was carried out in three areas:

(a) In the valley of the Lantár, along the main stream, at a distance of 128 kilometers (79.5 miles) from Ayán and about 53 kilometers (32.9 miles) from the mouth. Out of 30 prospecting shafts, signs of gold were met with in 13 along the lower line, the shafts with signs of gold situated nearest to the river bed remaining unfinished. Among the shafts completed, in No. 4 was discovered a bed with an average yield of 2.6 grams to the ton; in No. 18, with 1.12 grams; in No. 19, with 2.29 grams. The gold found was both fine and coarse, flat and bright; fineness, 897.9.

(b) Along the stream Durúkin, falling into the Lantár on the right, 5 or 6 kilometers (3.1 or 3.7 miles) above the first prospecting, 3 lines of prospecting shafts were made. Among 23 of these shafts, 3 were found to yield very good signs of gold. In 4 shafts was found a bed with an average yield of 0.8 to 1.4 grams, the gold being fine, even, and bright; fineness, 898.9.

(c) Along the Kaitchakit stream, a right tributary of the Lantár, 13 kilometers (8 miles) below the prospecting on the middle course of the Lantár, 3 lines of shafts were dug. Among 18 of these shafts, indications of gold were found in 17. In the lowest line 2 shafts disclosed a bed with an average yield of 3.4 to 8.12 grams per ton. From the bottom of the shaft and its cracks were taken 69.67 grams of gold. The trench between these shafts disclosed a bed of 0.5334 meter (1.7 feet) in thickness, with an average yield of about 26 grams per ton. In the second line 2 shafts showed a bed with an average yield of 0.3 to 3.4 grams per ton. Shallow placer with rich pockets; gold coarse, with nuggets or fine, but dull; fineness, 850.

(3) *The system of the River Muté.*—During the preliminary prospecting here signs of gold were met with along the left head waters of the river, where coarse, heavy gold was found.

(4) *The system of the River Nemúi.*—Signs of gold were found in many places, both in the valley of the Nemúi and along its affluents, in the mountain belt between Jugjur and the shore ranges, whereas no signs of gold could be met with along the springing from the Jugjur watershed. The gold found was in the form of large rolled grains or small spongy masses, with coarse magnetite or fine crystals of brown iron ore from pyrites.

(5) *The system of the River Kyrán.*—In this extensive system, geologically explored in several directions, samples direct from the slope sides and from prospecting shafts were only taken along one of the left tributaries, where good signs of gold were met with at the water level in the form of large rolled grains.

(6) *The system of the River Janá.*—In the system of this river, which is the left tributary of the Udá, the expedition made first discovery of gold after ascertaining the geological and orographical isolation of the mountain belt, whose auriferous character was completely confirmed by further searching. Only in this system was the soil found to be perpetually frozen. At a depth of 4.8 meters (15.7 feet) good signs of gold were met with.

The observations of the expedition ascertained the fact that the climatic conditions of the regions explored, although somewhat severe, present no obstacles to the successful winter prospecting and subsequent working of the gold fields. The working period, however, is shorter than in the Amur region and eastern Siberia, viz, ninety days. Workmen, materials, and stores must be brought by sea.

THE FUTURE POSSIBILITIES OF SIBERIA.

[Consular Reports, November 7, 1900.]

The world has now to deal with a new factor. Ten years ago the name "Siberia" called up a picture of wastes of snow and ice, boundless tundras (steppes), and coasts white with icebergs. To-day the same Siberia is a land filled with thriving villages of peasant farmers, producing grain and various vegetables. That great compeller of civilization, the railway, has broken down the bars between the world and Siberia.

Besides its countless resources of the soil, besides its rivers filled with valuable fish and its forests inhabited by fur-bearing animals, Siberia is now beginning to show to the world its resources of gold, iron, copper, manganese, quicksilver, platinum, and coal, the yearly output of which is but a feeble index of what it will be when the deposits are developed.

In the past three years several American mining engineers have traversed various parts of Siberia and central Asia. The testimony of these gentlemen is corroborated by that of other foreign engineers who have visited the country—that the lack of exploitation of such evident mineral wealth as is found here is unparalleled in other parts of the civilized world. Of these resources, gold is by far the most important, as it is, curiously enough, the least developed. Taking the product of the Russian Empire approximately at \$25,000,000 in gold per year, it seems comparatively insignificant. It places Russia fifth among the gold producers, and is but little more than the present annual gold output of the State of Colorado.

According to the reports of Mr. C. W. Purington, an American mining engineer, whose last two seasons have been spent in Siberia, the bulk of the Russian gold product comes from Siberia, a considerable portion from the neighboring Ural chain, and an insignificant portion from Finland, Turkestan, and other portions of the Russian Empire. The greater part of the Siberian product is from the region to the north of the Amur River, about the sources of the Lena and Olekma rivers. The product of Siberia in gold, though small as compared with that of the United States or the Transvaal, is yet great enough to make it an important factor in the world's economy. Yet it is almost entirely placer gold, and the quartz veins and original deposits of gold, though exposed to view in many places, both in the Ural Mountains and Siberia, have been hitherto unworked in any but the most inefficient manner.

Furthermore, antiquated and expensive methods are in use by even the largest companies for working the placer deposits, these methods having undergone no improvement during the last fifty years. At numerous mines in Siberia 2,000 men and 500 horses are used on a single property to produce gold not exceeding \$2,000,000 per annum. In some cases, as in the platinum mines of the Ural, the above-mentioned quota of men and horses is employed for an output not exceeding \$800,000. This on ground, too, where the employment of dredges and mechanical excavators is in all ways feasible, and where oftentimes the auriferous gravel could be advantageously conveyed to the washing machines by wire-rope gravity trams. Mr. Purington

states that, according to conservative calculations, if mechanical conveyors and improved types of sluices were installed in mines in Siberia at present worked by the old methods the gold output of the Russian Empire would be increased at least three times over its present amount. On account of the general flatness of the country, mining by means of hydraulic power will never have a great future in Siberia; but in many districts sufficient grade can be obtained for the use of hydraulic elevators. For dredging river beds the method of placer mining now pursued with such success in California, Montana, and New Zealand could well be employed in the Siberian gold fields. It may be said that the miles of auriferous river beds capable of being so worked number tens of thousands. This statement will seem the less improbable when it is considered that Siberia is a country inside of which the whole of the United States could be placed, with plenty of room to spare, and that vast portions remain unexplored, as yet, even by the Russians.

Of the quartz deposits in Siberia it may be said that they are entirely undeveloped. There are probably to-day not over a dozen stamp mills operating in the whole country, and it is doubtful if over 150 stamps are dropping. Of the old type of roller-type gold mills there are also a few. It is a significant comment on the quartz ledges of the country to say that even with the makeshift contrivances in use the operations frequently pay large profits. Deep mining is unknown; it is doubtful if there is a single shaft in the limits of the Russian Empire which has penetrated a precious-metal deposit to a depth greater than 700 feet. At water level, where the free-milling ore stops and sulphurets begin, work is discontinued; and, except in two or three instances along the Ural chain, the working of concentrates by cyaniding or chlorination is unknown. So far as known, only one operator, Mr. de Zelienskoff, mining in Kochtar and southern Ural, has installed thoroughly up-to-date milling, concentrating, and chlorination plants.

In the districts along the Yenisei River quartz veins with visible free gold and uncovered for lengths varying from a few to many thousands of feet may be seen in the old placers and penetrating the surrounding hills. In the Onon River district, in the region of the Trans-Baikal, quartz mining of immense masses of ore has been carried on in a desultory and inefficient manner for several years. The largest mill in the region is of twenty stamps, and, as described by Mr. Levat, French mining engineer, in an excellent published report on that district, is just the reverse of what an efficient gold mill should be. In the Ural Mountains, along the river Serebrana, Mr. Purington, while examining a placer deposit, discovered an immense low-grade lead of auriferous slate of over 500 feet in width, which, on being sampled, gave results in gold equal to those of the celebrated Treadwell deposit in Alaska, on Douglas Island. It can not be doubted that numbers of such deposits exist throughout Siberia, affording opportunities for the installation of large stamp mills, with accompanying concentration and reduction plants.

The difficulties of transporting machinery to such deposits are much less than generally supposed. Of high mountains, such as the Rockies and Sierra Nevada, Siberia has practically none. In the Caucasus alone are precipitous peaks and high passes. As is well known, the interior of Siberia is penetrated by a network of vast waterways, rendering inland transportation easy and cheap. Heavy freight can be laid down in central Siberia, at the majority of the mines about the Yenisei River, at prices not exceeding \$40 a ton from New York. If water transportation is made use of, this price may be reduced nearly one-half. It is perhaps not generally known that freight loaded at Hull, England, is transported via the Arctic Ocean to the mouth of the Yenisei River, where, being reloaded to steamers of lighter draft, it is shipped direct to Krasnoyarsk, the crossing point of the Trans-Siberian Railway, and even as far south as Minusinsk, close to the Mongolian frontier. From San Francisco to the gold mines of the Omgoon River, in eastern Siberia, it is a matter of water transportation entirely, the route via the Amur and Omgoon rivers being navigable to steamers the whole distance to the mines. The same is true of many of the rich placers along the Zeya and Selinga rivers, farther up the river Amur. Regular steamer lines, furnishing excellent accommodations for passengers, ply during the open season from Nicolaievsk, the mouth of the Amur, to Stretensk, the present terminus of the railway, a distance of nearly 2,000 miles. It is now possible to go from New York via Berlin, Moscow, and Irkutsk to Vladivostock, on the Pacific, in twenty-five days. A railway which shall almost connect Asia and America at the Bering Straits may be predicted as of the future. There is, engineers say, no obstacle in the way except the terrific cold of winter and the immense fields of tundra through which a path must be cut. A railway line through such a country as northeastern Siberia will not be so difficult to construct as was the line of the White Pass and Yukon route.

Prices paid for labor in Russia and Siberia are exceedingly low—from 15 cents to \$1.50 per day, the laborers in every case feeding themselves out of their earnings. It will be asked why the variation in price is so great, and also how it is possible to

hire miners for so little money. In the first place, the proximity or remoteness of centers of population and agriculture is responsible for the widely differing scales of wages. For example, in the region of the southern Urals, where much grain is raised and where the country is thickly settled, the labor of men and of women at the placers is paid from 30 kopecks (15 cents) up to 70 kopecks (35 cents). In this region the labor of a man with horse and cart costs but 45 cents per day of ten hours. This statement is vouched for by all who have collected economic figures of the district. In the northern Urals the prices are about 25 per cent higher. In central Siberia men are contracted for by the year at \$15 per month, while in northern and eastern Siberia, in the regions of intense cold, wages range from \$1 to \$1.50 per day, according to the remoteness of the mine from the center of supply. Second, the reason of the cheapness of mining labor in Siberia is that the wants of the people are few. The workmen are of the peasant class, and it may be said that the larger proportion of them can neither read nor write. Their food consists of mutton, black bread, domestic fowls, eggs, milk, and tea. Most of the necessities of life are supplied by their own farms or gardens, and their purchases, besides tea, sugar, and vodka (the national stimulant), are few. Their clothes cost but little, and their enjoyments are usually limited to the celebration of the numerous civil and religious holidays by mutual visiting and the consumption, in greater or less quantities, of vodka. It will be a natural query if the labor supplied from such sources and nourished in so primitive a fashion is efficient. It is said that in no country can be found men who more cheerfully sustain the hard labor, privation, and sudden and severe changes of climate than the Russian and Siberian peasants. Witness, for example, the notably efficient service rendered to the Russian army by the Cossacks, who are nourished and reared in the manner described above. No more hardy and enduring men can be found in any country. The bulk of the mining labor is Russian, while in the Ural many Tartars and Bashkirs are employed, and in eastern Siberia the miners consist, besides Siberian peasants, of Chinese and Manchoo coolies.

That laborers in Siberia will at once alter their methods, exchange their awkward picks, shovels, and axes for those of American manufacture, and take hold of the operations connected with a California quartz mill or repair a hydraulic ditch is not to be expected. The largest Siberian washing machine at the present day does not work over 750 cubic yards of gravel in twenty-four hours. Such an operation involves the labor of over 100 men and from 40 to 60 horses, costs from 16 to 23 cents per yard worked, and does not in any case save over 80 per cent of the gold. California methods now in use, I am informed, work from 1,000 to 2,000 cubic yards per twenty-four hours, the operation involving the labor of perhaps 20 men at the outside, at a cost varying from 1 to 8 cents per yard, while the amount of gold allowed to escape is so nearly insignificant as to be a negligible quantity.

One important feature in connection with the conducting of mining operations in Siberia is the aptitude of the Russian workman for the ax. Wood is so plentiful in the country that in no case will the price for fuel exceed \$1 per cord, and mining timbers may be figured on at a correspondingly low rate. The current anecdote that a Russian workman will, for a 20-kopeck piece, lay his left hand with fingers spread on a board, and with full strength make an ax cut between each finger can not be vouched for; but it is certainly true that in pick timbering in bad ground, in erecting buildings, log cabins, and all manner of wood joining the equal of the Russian peasant can not be found. In the copper mines of the Ural, at Tagill and Bogoslovsk, where practically the only example of deep underground mining in the Empire may be seen, the timbering is sufficiently solid to have sustained the Pyramids of Egypt, and, although clumsy and ill directed in the extreme, the example shows what may be done by the same miners under sensible supervision.

It is a statement the truth of which has been determined by experience that if the Russian peasant be treated by his foreign employer with tact and consideration he proves, in the majority of cases, an efficient and willing worker.

The mining laws of Russia allow the taking up of mining claims indiscriminately by Russians or by foreigners. The only persons not allowed this are Jews, clergymen, and persons not in possession of their civil rights in their own country. Claims consist of 280 acres of land, generally surveyed at the locator's option, with a length of about $2\frac{1}{2}$ miles and a width of from 700 to 1,000 feet. A quartz claim contains the same number of acres, but is generally more clearly surveyed, in a form of a square, with boundaries 3,500 feet, or 1 Russian verst, long. The form of the claim is at the locator's option, and the only restriction placed is that the width shall not be less than 700 feet. At location but one stake is driven, which is sufficient to hold the location for two years, during which time it is expected that a Government survey will be ordered by the locator. On the completion of the survey the Government title is given, corresponding to a Land Office patent. The locator then becomes the holder of the claim and the owner of all minerals therein contained, on condition of

an annual payment to the Government of \$50. No development work is required, either before or after the patent is obtained. No limit is placed upon the number of claims which an individual can locate. Several American engineers, among them Mr. B. E. Keating, of Providence, and Mr. C. W. Purington, of Boston, have recently received patents to groups of placer claims in Siberia, where extensive dredging operations are now being undertaken by American syndicates. It is impossible to estimate the number of miles of gold-bearing creeks still free for location in Siberia, but since it is absolutely impossible to work low-lying gravels by Siberian methods now in vogue, and since these gravels are in consequence deemed comparatively worthless by the Siberian gold miner, the amount of free land must certainly be enormous. In California at the present day gravels along the Father River which contain but 15 cents to the cubic yard in gold are being worked at a profit, and this with labor at from \$2.50 to \$3 per day and fuel at from \$3 to \$5 per cord. In Siberia river beds of a similar character will carry on an average not less than 20 cents in gold to the cubic yard of gravel, while, as shown in the statements above, the cost of working should be materially less.

Cities of from 10,000 to 50,000 inhabitants are now numerous in Siberia. Hotels supplied with comfortable rooms, restaurants which may truly be said in many cases to be palatial, electric lights, and telephone connections are not difficult to find. One may now traverse Siberia with his hands folded, if he so wishes, as the elegant weekly vestibule, supplied with bath, piano, dining saloon, drawing room, leather sofas, easy chairs, and observation car, the whole fitted with electric lights and call bells, rolls from Moscow to Irkutsk. The cost of this remarkable journey of 3,200 miles, including sleeper, is but \$44, first class.

To the majority of the inhabitants of St. Petersburg and Moscow Siberia is as unknown as it is to the people of the mountain districts of Tennessee. When men of affairs in Moscow were asked what clothes to take to Siberia, they replied that furs were always necessary on account of the intense cold. Actual experience in the city of Krasnoyarsk showed that the thermometer registered 110° for days together in the month of August, and any clothes but those made of silk and linen were absolutely unendurable.

But let Siberia speak for herself; let the globe trotter get away from the Cook agencies for a month and see a new world, where elements of strength and virility soon to be felt in the struggle for existence are but waiting to develop under the touch of Western enterprise. Some advance has already been made, as is evident when American mowing machines are seen rattling through the streets of Tomsk and a policeman may be noted riding a United States bicycle through the dusty highways of Krasnoyarsk. The beginnings are small, but the straws blow with the wind of progress.

THOMAS SMITH, *Consul*.

Moscow, *October 8, 1900.*

RUSSIAN LAWS ON GOLD MINING.

[Consular Report No. 239, August, 1900, pp. 495-499.]

Commercial Agent Greener writes from Vladivostok, April 19, 1900:

I forward herewith translation and condensation of a recent French publication, which furnishes information on a subject in regard to which I have had many inquiries. This report is accurate to 1898. It is possible that among the reforms contemplated some slight changes may be already in operation. I have failed to obtain notice of them from those most likely to be informed.

All laws relative to mining operations are contained in volume 8, Laws of the Empire (edition 1893). Some provisions referring to the same subject are to be met with in volumes 9, 12, 13, and 15.

Besides general regulations, the mining code contains under special sections laws relating to—

- (1) Mining in the country of the army of the Don Cossacks.
- (2) Mining in Poland.
- (3) Private operations on State lands.
- (4) Coal mining in Sakhalin.
- (5) Working of amber.
- (6) Gold mining.
- (7) Petroleum industry.
- (8) Salt industry.

From the standpoint of mining, Russian lands may be divided into four large classes: (1) Freehold lands; (2) lands in possession (so called); (3) lands of the Empire; (4) land under His Imperial Majesty's cabinet. These latter are the private property of the Emperor. By "lands in possession" are understood forest lands,

ground plots, etc., assigned by virtue of an imperial rescript to certain metallurgical industries. There are few such holdings now. "Military lands" might be added to the above subdivisions, granted to certain of the Cossack armies, i. e., military colonies and peasant lands.

The following is a summary of the principal enactments relative to gold mining:

The articles relating to gold mining are Nos. 416-540 (p. 123 et seq.), French edition, Russian mining code.

WHERE MINING IS PERMITTED.

(1) *Auriferous sands*.—Throughout all Siberia private individuals may engage in working auriferous gravels on all lands, irrespective of their ownership, whether belonging to the domain of the Empire or even to the cabinet of His Imperial Majesty. The mining districts of the Altai and of Nertchinsk are exceptions to this rule. A list of places where private individuals may work placers even in these districts may be found in paragraph 417, mining code (p. 305, French edition). Besides the places there mentioned the basins of the rivers Kadrin, Choui, Argont, and Kafoun were thrown open to private gold-mining industry in 1894. In this province, the seaboard or maritime, the regulations may be modified in cases where modifications may be deemed indispensable on account of special local conditions. This holds good also of the Amur Province. Two special permits have already been granted—one to Mr. Enoch Emery, doing business for years in the Amur, and one to Mr. David M. Clarkson, of the Maritime Province, both Americans.

These special privileges are unique and not likely to be obtained easily. Their greatest value, indeed, is the removal of certain restrictions which have hitherto prevented a foreigner from enjoying equal privileges with Russians in these two provinces.

(2) *Auriferous veins*.—Private persons may prospect and work gold reefs in all places where placer diggings are permitted, except in the districts of the Altai and of Nertchinsk, which are the private property of His Imperial Majesty. If veins are discovered in the "pochva" (bed rock) of placers already being worked, owners are permitted to mine them within the legal boundaries of their concessions.

RIGHTS OF OPERATORS.

Temporary permits are granted to private persons to conduct mining operations on the domain of the cabinet of the Czar until the workings are exhausted.

Holders of placer concessions may work veins discovered on their claims without special permit or the payment of a special tax, provided notice be given to the proper authorities.

WHO CAN CONDUCT MINING OPERATIONS.

Persons of any condition or nationality (Russian or foreign) who are in the enjoyment of full civil rights may work auriferous deposits.

The exceptions are: (1) Hebrews, where local law forbids their residence; (2) mining, legal, and police officials; (3) officials of the central general administrative regions; (4) wives and children of such functionaries. In addition, in the Maritime Province and the Amur and adjacent islands on our coast, the right to mine gold or any mineral is reserved to Russian subjects except in the special grants referred to.

Hence individuals debarred from carrying on gold-mining operations on their own behalf can not act as attorneys or agents for other persons in such matters.

PROSPECTING.

To acquire the right to prospect for either alluvial or quartz gold all persons or companies must procure a special permit on stamped paper issued by the department of mines. Permits contain no time limitations and are not transferable. A declaration in writing must be made to the police department of the locality where operations are proposed. The locality must be designated, as well as names of men belonging to the prospecting party, the date the expedition is to set out, and the place of departure. The passport and papers of each person must be accurately set forth. The cost of advertising the permit in the local press must be paid. In free territory prospectors are entitled, so far as placer mining is concerned, to occupy an area of 5 versts (3.3 miles) in length and in breadth the width of the valley in which operations are conducted; in quartz mining, to an area within a radius of 1 verst (0.663 mile) from a post bearing the date when prospecting began and the name of the individual or company. After the post is set up the right to prospect continues as long

as the party stays on the tract so marked out. Should the ground be found sufficiently rich to be worthy of "a request for a location," at least two shafts must be sunk, demonstrating the presence of gold, and "location posts" in place of the "prospecting posts" must be set up.

HOW TO REQUEST A LOCATION.

When a deposit is ascertained to be capable of being worked, a declaration of the fact must be made, in the form prescribed in paragraph 454, mining code (French edition), at the office of the chief of police in the district where the discovery is made. One copy of the declaration must be sent by the applicant for the location within three months, without fail, to the chief office of mines, for publication in the local press; another copy goes to the district engineer, to be recorded in the register of applications for concessions. The copy sent to the chief office must be accompanied by a sum sufficient to pay expense of publication in the local press.

HOW TO PROCURE A CONCESSION.

The district engineer takes note of the copies of the declaration sent to him. He passes upon those meeting the requirements of the law and grants locations according to the requests of the claimants.

These allotments of land (otvodi) take place in the spring, summer, and autumn, and must be made by a special commissioner of locations (otvodchik) within a period of two years from the date of the district engineer's grant. In eastern as well as in western Siberia the total length of a placer allotment must not exceed 5 versts (3.3 miles) in length, calculated from the "indicator's posts;" in breadth, it may comprise the whole valley to the extent of 250 sagens. (NOTE.—Springs and rivulets flowing into the river from either side must not be annexed to the concession, even if they have not been already allotted to previous concessionaries, beyond a distance of 250 sagens—1,750 feet—from their point of junction with the river.) An allotment granted for a gold-bearing vein may be of any dimensions, provided its area does not exceed 1 square verst and the breadth is at least a third of its length.

The same individual and company can not receive two adjacent concessions; after one allotment has been obtained, a second can not be granted except at a distance of at least 5 versts (3.3 miles) from the first. Holders of adjacent lots, however, are permitted to associate themselves into companies after the concessions have been granted. By arrangement with the local authorities, operators can, in addition, obtain a concession of land in the vicinity on which to erect their plant, subject to payment of a special rent. As soon as the location has been staked out and surveyed by the special commissioner, in the manner prescribed by the regulations, his notes, together with the plans and a statement of the area of the lot, are sent to the district engineer, who forwards them to the chief mining office. The papers are here verified and confirmed, after which, and within six months, the concessionary receives from the mining office a copy of the plan of the grant, with the notes of the otvodchik, certified and sealed with the imperial seal. A fee of 2 kopecks per dessiatine (1.028 cents per 2.69 acres) is payable upon delivery of the plans.

LOCATION OF MINING LANDS BY PUBLIC AUCTION.

Where there is failure to comply with the regulations for prospecting and making declarations applicants forfeit their right to the concession, and the domain or the cabinet of His Imperial Majesty again resumes possession of the land. In like manner, should a concessionary decline to utilize the allotment granted, or should he fail to acknowledge within two years the receipt thereof, the lot is restored to the domain. This is also true if taxes and fees are not paid.

Each year, between February 1–14 and 15–28, lots reverting to the domain are put up at auction at the office of mines. The auction is by sealed tender. Where two or more bids are equal, lots are drawn to determine ownership. Concessions not sold are put up for auction again the following year.

MINING OPERATIONS.

After the request for location has been granted the land may be cleared, the preliminary work undertaken, a more minute examination may be made, and actual working begun as soon as the documentary concession is in hand. Methods are left wholly to the operator. Work must be carried on without danger to the health or life of the workmen. Residues which still contain gold (efeli) must not be mixed with the waste earth or "torf" (turf or peat).

After the mine is exhausted the operator must return the deeds of the concession to the district engineer. Buildings must be removed within a period of six months. In Siberia timber required for use in the workings may be taken from the imperial lands free of charge, except when special or local prohibitions have been made by governor-general or local councils. (Paragraphs 512-532 regulate the use of water in the mines.)

LAND TAXES AND DUES ON THE OUTPUT.

The Russian mining code has two kinds of taxes:

(1) Land dues, calculated pro rata on the superficial area of the lot, payable from the date when the deeds granting the concession were received; due for the current year on December 31, and subject in case of nonpayment to the addition of a fine of 10 per cent.

(2) Taxes in kind, based upon the amount of pure metal (gold or silver) extracted, and deducted in the laboratories.

With regard to these taxes, a distinction must be observed between private lands and the property of the Empire; between lands "in possession" and those of the cabinet of His Imperial Majesty. In this latter category are comprised the districts of Verkhneoudinsk and Bargouzin.

Auriferous localities in imperial territory are divided into three classes:

Categories or classes.	Freehold lands and imperial domains.		Lands in possession (tax per pood—36.112 pounds).
	Land tax.	Tax per pood (36.112 pounds).	
First class (district of the Olekma).	10 rubles (\$5.15) per annum per dessiatine (2.69 acres).	<i>Per cent.</i> 10	Half as much again as the tax imposed upon gold extracted from freehold lands or from the imperial domains.
Second class (district of the Amur and maritime province).	5 rubles (\$2.57) per annum per dessiatine.	5	
Third class (west and east Siberia, the governments of Perm, Orenburg, the Khirghiz steppes).	1 ruble (51.5 cents) per dessiatine.	3	

In the territory attached to the cabinet of His Imperial Majesty, the following table gives the dues and taxes imposed:

Locality.	Land tax.	Taxes.	
		Upon the annual output.	Rate.
Districts of the Altai and districts of Verkhneoudinsk and Bargouzinsk.	15 kopecks (0.77 cent) per annum per running sagan (7 feet).	From 1 zolotnik to 2 poods.	5 per cent.
Do.....	do.....	From 2 to 5 poods.	5 per cent for the first 2 poods; 10 per cent for the remainder.
Do.....	do.....	5 poods and over..	10 per cent for the first 5 poods; 15 per cent for the remainder.
District of Nertchinsk.....	.....	.....	15 per cent.
Districts of the Amur, etc., lands of His Imperial Majesty.	.....	.....	By special agreement between the operators and the cabinet.

In addition to the land dues and tax per pood,¹ there is charged for the transportation of the gold to St. Petersburg: From Irkutsk, 46 rubles (\$23.69) per pood; from Tomsk, 33 rubles (\$16.99). The conveyance of the gold, in sealed sacks, from the mines to the district office of the mining police and thence to the department of mines, is at the expense of the mine owner. In this province (maritime) the charge is 150 rubles (\$77.25) per pood.

¹ 1 pood=36.112 pounds.

The operator must bear the cost of melting down the gold. The fee, by the new regulation of February 3, 1897, is uniform—42.315 rubles (\$21.79) per pood of pure gold.

Mr. Greener adds:

Such a tax per pood, at best when it exceeds a certain rate (say 3 to 5 per cent), is without doubt detrimental to the development of the gold-mining industry, at least by outsiders, for it obliges the operator to confine himself to deposits sufficiently rich to enable him to pay this duty before meeting his own expenses.

It is possible this tax, which has no equivalent in mining laws of other great gold-producing countries, may be abolished or lessened in the reforms in the mining code which are about to be introduced by the Imperial Government.

SERVIA.

The *Statistique de l'Industrie Minérale* for 1897 places the gold product of Servia for 1896 at 20 kilograms, fine, valued at 69,000 francs, and its silver product at 570 kilograms, fine, valued at 60,000 francs. These amounts correspond to \$13,292 for the gold and to \$23,689 (coining value) for the silver. In default of later figures the same values are assumed for 1897, 1898, and 1899.

SPAIN.

No official figures have been received from Spain regarding the product of fine gold and silver for 1898. The Spanish official statistics give the value of the mining product on the ground and the value of the product of the smelting works. In the absence of official data relating to the fine product, this Bureau has relied upon the estimates of the French official *Statistique de l'Industrie Minérale*. The figures of the latter materially disagree, however, with those of the *Estadística Minera de España*, reproduced in the French official *Annales des Mines*. Mr. André Barthe, in a series of articles in *L'Économiste Européen*, has made a special study of the silver production, trade, and coinage in Spain from the earliest times, based upon original Spanish sources. In giving the results, somewhat conflicting, of all those publications this Bureau does not vouch for their accuracy.

The following table, reproduced from the *Annales des Mines* (1899, Nos. 4 and 9), is an abstract from the *Estadística Minera de España*:

PRODUCTION OF SMELTING WORKS AND REFINERIES.

Classification.	1898.			1897.		
	Ore operated upon.	Product.	Value.	Ore operated upon.	Product.	Value.
	<i>Metric tons.</i>	<i>Kilograms.</i>	<i>Pesetas.</i>	<i>Metric tons.</i>	<i>Kilograms.</i>	<i>Pesetas.</i>
Fine gold	575	3	11,690	100	1	4,000
Fine silver.....	849	76,295	9,325,778	294	71,168	7,778,180
Argentiferous lead.....	206,747	a 88,981	30,132,252	217,112	a 91,258	31,560,545

a Metric tons.

It is not stated whether these results were obtained from domestic ores only or from imported ores as well. The Spanish statistics of imports (*Estadística General del Comercio Exterior de España*) contain only the total weight and value of imported ores, without classifying the latter according to their metallic contents. It is thus impossible to eliminate the product of imported ores, if any, from the figures given in the table above.

A comparison with the mining results and the export figures will prove, however, that the imports of gold bearing and silver bearing ores must have been quite insignificant. The production of Spanish mines is given in the following table:

PRODUCTION OF SPANISH MINES.

Classification.	1898.		1897.	
	Weight.	Value on the ground.	Weight.	Value on the ground.
	<i>Metric tons.</i>	<i>Pesetas.</i>	<i>Metric tons.</i>	<i>Pesetas.</i>
Gold ore	555	10, 825	450	9, 250
Gold and silver ore			2, 006	40, 116
Silver ore	767	530, 469	982	508, 981
Argentiferous lead.....	244, 068	40, 118, 850	186, 692	18, 675, 064
Argentiferous iron	24, 110	341, 078	5, 559	96, 734

These figures are likewise reproduced in the British Mines and Quarries. A comparison between the preceding tables shows the production of gold to be very insignificant. The Statistique de l'Industrie Minérale gives the value of the gold output for 1897 as 196,000 francs (or pesetas), i. e., nearly four times the combined values of gold and gold-bearing silver ores extracted from the mines, and forty-nine times the value of the product of the smelting works. The French publication gives no authority for its figures, which must, therefore, be discarded.

The valuation of the gold ore is in its nature a matter of speculation. Besides, it is not stated whether it was made in gold or in paper currency. In the latter case the violent fluctuation of Spanish exchange in 1897, and particularly in 1898, would defeat all attempts at reducing the value of the annual product from Spanish paper to gold-standard value. The fine weight of the refined product is therefore taken as representing the Spanish production of gold, viz: In 1897 1 kilogram of a United States coining value of \$665, and in 1898 3 kilograms of a coining value of \$1,994.

Mr. André Barthe, in his study on the silver production of Spain, a translation of which will be found on another page, takes for the silver product the figures of the first table only, leaving out of consideration the silver contents of argentiferous lead, produced in large quantities by the mines. All of it seems to be exported to Germany, Belgium, France, and Great Britain, as shown in the following table, where the figures compiled from the Spanish statistics of foreign trade are collated with the product of the Spanish smelting and refining works:

PRODUCTION AND EXPORTS COMPARED.

Classification.	1898.		1897.	
	Weight.	Value.	Weight.	Value.
	<i>Kilograms.</i>	<i>Pesetas.</i>	<i>Kilograms.</i>	<i>Pesetas.</i>
Milled product: Argentiferous lead	88, 981, 000	30, 132, 252	91, 258, 000	31, 560, 545
Exports:				
Argentiferous lead.....	91, 936, 123	32, 177, 643	91, 795, 753	32, 128, 514
Argentiferous galena	5, 169, 332	1, 602, 493	6, 039, 827	1, 811, 948

All of the argentiferous lead being exported, as shown, it is impossible for the Spanish statistician to ascertain its fine-silver contents, nor are there any available statistics relating to the production of the refineries in those countries to which the lead is exported.

A comparison of the results presented in the preceding three tables discloses a few very important features. First of all we notice a large difference between the valuation of the ore at the mines and of the metallic product of the smelting and refining works, which is easily accounted for by the cost of smelting, while at the same time the valuations of the metallic product at the works and at the custom-house practically coincide. This may be accepted as an assurance of the approximate accuracy of the figures.

It is further made evident that a small portion only of the silver product could have come from the silver ore or argentiferous iron, the aggregate value of both at the mines in 1897 and 1898 being only 645,834 and 871,547 pesetas, respectively, while the value of the silver product for the same years was 7,778,180 and 9,325,778 pesetas, respectively. The difference can not be accounted for by the cost of smelting, which proves that the silver product of Spain is obtained chiefly from the argentiferous lead ores.

It is also more than probable that but a small portion of the silver product was won from imported ores, since Spain herself, as stated, exports all of her crude lead. In 1898, as seen from the tables above, 206,747 tons of argentiferous lead ore were smelted, whereas 244,068 tons were mined during the same year, leaving an excess of 37,321 tons, or 11 per cent, to be smelted later.

The stated quantities of tons of silver ore smelted can not be reconciled with the values set opposite them. In 1897, 982 tons of silver ore are stated to have been worth, at the mines, 508,984 pesetas, whereas a silver product valued at 7,778,180 pesetas is stated to have been won from 294 tons smelted; similarly, in 1898, 767 tons of silver ore are valued at 530,469 pesetas at the mines, whereas a silver product of the value of 9,325,778 pesetas is said to have been won from 849 tons smelted. The figures relating to the weight of silver ore obviously want an explanation and can not be used at the present time.

It will be found, however, upon an examination of the average value of the Spanish argentiferous lead that its silver contents must have been but very small. The average value of a metric ton of argentiferous lead in Spain would appear from the table above to have been, in 1897, 345.84 pesetas, and in 1898, 338.64 pesetas, which is equal, at coining rates, to £13 18s. 8d. per British ton of 2,240 pounds in 1897, and £13 12s. 10d. per ton in 1898. Confining ourselves to the last-named year, the price of foreign lead in London fluctuated between £12 6s. 3d. and £14 15s. per ton. The declared value of argentiferous lead in Spain, regardless of the rate of exchange, was nearly equal to the mean between the highest and the lowest prices of lead in the London market, with a margin of £1 2s. 2d. per ton left for the cost of shipping. But the course of the peseta, which, in the early part of 1898, fluctuated between 70 and 75 per cent of its face value, fell, immediately after the beginning of hostilities with the United States, to 47 per cent, and rose in October to 67 per cent.¹ So if the Spanish valuation should be taken to be in paper currency, then the value of argentiferous lead in Spain

¹A. de Foville, in *Journal of Political Economy*, December, 1898, reprinted in last year's report of this Bureau.

would fall below £10 9s. per ton (at the maximum rate of exchange for the year—75 per cent), which would be at least £1 17s. 3d. below the minimum price of lead in London. It is evident that the selling price of Spanish argentiferous lead might well have kept within the price limits of lead, so that it would be impossible to calculate the excess of the selling price of Spanish argentiferous lead over the market price of the base metal alone. It could not exceed, however, the shipping charges plus the difference between the average price of the Spanish product at the face value of the peseta and the lowest London price of lead, which difference amounted to 6s. 7d. per ton, or somewhat over 2 per cent of the value of the former. As it can not be supposed that all Spanish argentiferous lead was sold at the time when the price of lead was at its lowest ebb, it is evident that the value of the silver contents of the Spanish lead must have been less than the cost of shipping 88,981 tons of freight from Spain to London minus the loss on the exchange rate of the peseta.

The maximum limit must be so narrow that this element of the silver production may safely be disregarded. The error is probably reduced still further if some portion of the smelted product was won from imported ores.

The silver product of smelting works is, therefore, taken as representing the total silver product of Spain, viz, 71,168 kilograms in 1897, and 76,295 kilograms in 1898.

The standard of fineness is not given, but the product is generally designated as fine. The average values, as given in the table above, would correspond to \$0.656 per ounce in 1897 and \$0.734 in 1898. This is evidently at the face value of the peseta. An attempt to discount its value at the average rates of exchange would, for reasons stated above, lead to uncertainty.

The weight of the refined product must, therefore, be taken as a basis for computing its value.

The weight and the United States coining value of the silver production for 1897 and 1898 are presented in the table below:

Year.	Silver production.		
	Kilograms.	Ounces.	United States coining value.
1897.....	71,168	2,288,104	\$2,958,356
1898.....	76,295	2,452,940	3,171,478

PRODUCTION OF SILVER IN SPAIN.

By ANDRÉ BARTHE.

[Translated from *L'Économiste Européen*, Paris, December 1, 1899, p. 676.]

There is no trace of the working of mines in Spain from the time of the division of the Caliphate of Cordova to the end of the eighteenth century.

The competition of the American mines made the operation of the Spanish mines impossible, but when the separation of the colonies had interrupted the shipments of gold and silver, the exploitation of the Spanish mines was resumed. In 1825 concessions for forty-eight mines were issued. In the following years still more were opened, but a large part of these were failures to a greater or less degree, and the actual number of silver mines is fifty-seven, of which seven are being worked.

The documents which I have been able to consult give details of the production of

silver only since 1861. It is probable that the production of the years preceding did not reach a very large amount, for aside from the mines of Hiendelauncina, which send their product to the mint at Madrid, no other mines are given as being permanently worked.

We give herewith the details of the silver produced in the mines:

PRODUCTION OF FINE SILVER IN SPAIN SINCE 1861.

Year.	Kilograms.	Year.	Kilograms.
1861.....	8,020	1881.....	24,220
1862.....	13,759	1882.....	46,898
1863.....		1883.....	54,335
1864.....	25,238	1884.....	26,301
1865.....		1885.....	31,026
1866.....	22,533	1886.....	39,061
1867.....	24,863	1887.....	51,502
1868.....	24,807	1888.....	43,332
1869.....	31,272	1889.....	35,271
1870.....	28,655	1890.....	46,964
1871.....	31,524	1891.....	50,000
1872.....	32,983	1892.....	57,000
1873.....	36,081	1893.....	63,000
1874.....	12,743	1894.....	192,745
1875.....	5,913	1895.....	58,546
1876.....	33,200	1896.....	64,551
1877.....	92,400	1897.....	71,168
1878.....	96,700	1898.....	76,295
1879.....	70,400		
1880.....	65,900	Total.....	1,689,209

It will not be amiss to recall that the production of argentiferous lead at the refineries has increased to a marked degree, as can be seen from the following table, which gives the two five-year periods 1880-1884 and 1891-1895:

Year.	Tons.	Year.	Tons.
1880.....	11,371	1891.....	76,621
1881.....	7,690	1892.....	93,710
1882.....	7,299	1893.....	91,491
1883.....	9,999	1894.....	88,432
1884.....	12,920	1895.....	83,978

In addition to this production there have been imports of considerable amount. The following table gives the imports and exports since 1889:

Year.	Imports.	Exports.
	<i>Kilograms.</i>	<i>Kilograms.</i>
1889.....	181	70,848
1890.....	68,479	
1891.....	534,813	(a)
1892.....	97,467	(a)
1893.....	394	15,001
1894.....	1,935	2,647
1895.....	4,425	19,175
1896.....	5,776	33,329
1897.....	243,540	65,145
1898.....	152,364	64,233
1899 (7 months).....	43,115	44,574
Total.....	1,152,489	314,947

a For these years the statistical returns do not give the silver in bars and the coined silver separately.

SWEDEN.

Minister Thomas writes that Sweden produced, in 1899, 106.2 kilograms of gold and 2,290.3 kilograms of silver. This gives 3,414 ounces of gold, of the value of \$70,580, and 73,619 ounces of silver, of a coining value of \$95,185.

TURKEY.

The following is the only official information received from Turkey relative to the production of gold and silver:

There are some silver-lead mines in the country, but no data exist as to the proportion of silver in the metal or the quantity produced, which, however, can not be considerable.

The Report of the Director of the French Mint for 1900 contains, on page 330, the following table:

PRODUCTION OF THE PRECIOUS METALS.

Year.	Gold.		Silver.	
	Weight.	Value.	Weight.	Value.
	<i>Kilos.</i>	<i>Francs.</i>	<i>Kilos.</i>	<i>Francs.</i>
1893	13	44,240	7,165	740,167
1894	12	38,010	7,809	809,872
1895	8	26,595	10,208	884,415
1896	10.7	35,497	7,007	743,445
1897	21.9	73,457	7,110	516,254

From this table it appears that the kilogram of gold was valued at 3,354.20 francs, while the French coining rate is 3,444.44 francs (p. 358), which would give an average fineness of 0.974. The quantity of the gold product is, however, so small that the difference would amount only to a fraction of a kilogram. The gold product for 1897 is taken at 21.3 kilograms, of the value of \$14,174.

A glance at the table will show that the silver product is not valued at coining rates for fine silver. The kilogram was valued, for 1897, at 72.61 francs, or at 33.7 per cent of its coining value in France (222.22 francs per kilogram fine), whereas the price of silver at the Paris Bourse fluctuated between 502.50 and 605 francs per 1,000 francs coining value, the average for the year being 541.98 francs. (Report of the Director of the French Mint for 1898, p. 61.) This would give an average fineness of 0.622 for the silver product, reducing the fine weight to 4,422 kilograms, or 142,157 ounces, of the United States coining value of \$183,778.

In the absence of official information the figures for 1897 are repeated for 1898 and 1899.

From Mines and Quarries, part 4, 1898:

Gold: A little alluvial gold is obtained in Thessaly and in some of the valleys of Macedonia. The river Pactolus, so famous in ancient times, no longer yields gold. Silver lead: Deposits of argentiferous galena appear to be worked on a small scale at Edremid and near Adana.

URUGUAY.

The Anuario Estadístico de la Republica Oriental del Uruguay for 1898, published in 1900, gives the following table of the production of

gold in the Department of Rivera, the United States value having been computed at this Bureau at the rate of \$1.03424 for 1 peso :

Year.	Weight.	Value.		
		Per kilo-gram.	Total.	United States currency.
	<i>Kilos.</i>	<i>Pesos.</i>	<i>Pesos.</i>	
1885	64.284	500.00	32,142.00	\$33,241
1886	85.009	500.00	42,504.00	43,948
1887	63.908	500.00	31,954.00	33,047
1888	25.734	500.00	12,867.00	13,307
1889	139.261	396.80	55,259.31	57,149
1890	207.695	418.59	86,938.09	89,911
1891	212.883	426.26	90,743.76	93,847
1892	121.579	441.16	53,635.97	55,470
1893	102.230	444.83	45,474.55	47,031
1894	34.511	444.56	15,342.39	15,867
1895	61.126	442.39	27,041.32	27,966
1896	55.998	446.50	25,002.72	25,858
1897	87.336	440.89	38,505.71	39,822
1898	74.708	445.00	33,245.06	34,382

In the absence of later data, the product of 1899 is assumed to be the same as in 1898.

VENEZUELA.

Minister Loomis says: "There is no silver produced in Venezuela, and no data in Caracas as yet to show what amount of gold was produced in 1899." The *Statistique de l'Industrie Minérale* gives the gold product for 1898 at 1,639 kilograms, fine. This is equal to 52,694 ounces, and corresponds to the value of \$1,089,279.

Subjoined are the figures of gold exports entered by the customs authorities of the Republic for the period of twenty-three years from July 1, 1875, to the end of June, 1898:

Period.	Weight.	Value.
	<i>Kilograms.</i>	<i>Bolivars.</i>
July 1, 1875, to June 30, 1896	69,214.220	174,293,729.24
July 1, 1896, to December 31, 1896	1,503.650	3,806,745.00
January 1, 1897, to June 30, 1897	715.839	1,575,225.00
July 1, 1897, to December 31, 1897	979.890	2,412,205.92
January 1, 1898, to June 30, 1898	1,326.550	3,233,250.92

No statistical accounts were kept previous to 1875. The figures given above fall short, however, of the actual exports, large quantities of gold being smuggled out of the country and escaping the control of the customs officials. (From *L'Économiste Européen*, March 16, 1900.)

The German consul at the port of Ciudad Bolivar reports that the exports of gold from Venezuela in 1899 amounted to 30,965 ounces, valued at 2,910,625 bolivars. (*Deutsches Handels-Archiv*, September, 1900, p. 502.)

This falls considerably short of the figures stated by the former publication for 1898. In the absence of more accurate information, the latter figures are repeated for 1899.

PART III.

GENERAL STATISTICS.

I.—DEPOSITS AND PURCHASES OF GOLD AND SILVER BY

Description of deposits.	COINAGE MINTS.			ASSAY OFFICES.	
	Philadel- phia.	San Fran- cisco.	New Orleans.	New York.	Denver.
GOLD.					
Domestic bullion, unrefined ...	<i>Stand. ozs.</i> 6,067.999	<i>Stand. ozs.</i> 221,382.124	<i>Stand. ozs.</i> 191.353	<i>Stand. ozs.</i> 412,810.334	<i>Stand. ozs.</i> 197,325.422
Domestic bullion, refinery bars .....	.....	.....	.....	550,174.183	319,648.755
Domestic bullion, refined .....	.....	1,237,027.219	.....	726,644.514	437,683.107
Total domestic bullion...	6,067.999	1,458,409.343	191.353	1,689,629.031	954,657.284
Domestic coin, mutilated and abraded	12,685.754	255.989	1,967.294	40,507.583	8.318
Domestic coin, Treasury trans- fers	17,778.950	283.940	.....	.....	.....
Foreign bullion, unrefined.....	4,595.415	167,883.352	16,351.012	150,721.264	453.680
Foreign bullion, refined .....	.....	19,864.125	.....	321,165.960	.....
Foreign coin	69.297	697,743.582	163.235	330,353.281	.....
Jewelers' bars, old plate, etc ...	37,684.008	1,489.735	3,311.903	122,134.201	1,766.965
Total deposits.....	78,881.423	2,345,930.066	21,984.797	2,654,511.320	956,886.247
Redeposits:					
Fine bars	1,207,629.631	.....	.....	.....	.....
Mint bars	1,674,952.577	.....	.....	.....	.....
Unparted bars	766,315.034	667,003.179	5.014	71.957	90.814
Total redeposits.....	3,648,897.242	667,003.179	5.014	71.957	90.814
Total gold operated upon.	3,727,778.655	3,012,933.245	21,989.811	2,654,583.277	956,977.061
SILVER.					
Domestic bullion, unrefined ...	6,617.10	42,976.36	185.43	230,201.64	62,343.67
Domestic bullion, refinery bars .....	.....	.....	.....	72,358.40	6,380.57
Domestic bullion, refined	9,158.06	.....	.....	5,429,417.43	.....
Total domestic bullion...	15,775.16	42,976.36	185.43	5,731,977.47	68,724.24
Domestic coin, mutilated and abraded.....	2,406.92	72.68	397.26	299.69	.....
Domestic coin, Treasury trans- fers	3,116,847.37	238,565.45	810,397.20	.....	.....
Trade dollars	226.20	.....	6.94	.....	.....
Foreign bullion, unrefined ...	1,234.51	82,687.51	3,421.49	604,108.15	97.99
Foreign bullion, refined.....	.....	.....	.....	4,313.23	.....
Foreign coin	255.51	15,254.26	33.46	27,096.44	.....
Jewelers' bars, old plate, etc ...	71,196.78	480.53	5,975.75	501,751.94	628.15
Total deposits.....	3,207,942.45	380,036.79	820,417.53	6,869,546.92	69,450.38
Redeposits:					
Fine bars	158,821.84	3,870,452.11	12,884,952.62	16,493.47	.....
Mint bars	16,136.72	.....	.....	.....	.....
Unparted bars	135,160.01	182,733.37	.61	101.26	33.24
Standard bars.....	.....	.....	98,612.08	.....	.....
Total redeposits.....	310,118.57	4,053,185.48	12,983,565.31	16,594.73	33.24
Total silver operated upon.....	3,518,061.02	4,433,222.27	13,803,982.84	6,886,141.65	69,483.62

III.—DEPOSITS AND PURCHASES OF GOLD AND SILVER BY VALUE

Description of deposits.	COINAGE MINTS.			ASSAY OFFICES.	
	Philadel- phia.	San Fran- cisco.	New Orleans.	New York.	Denver.
GOLD.					
Domestic bullion, unrefined...	\$112, 893. 00	\$4, 118, 737. 19	\$3, 560. 06	\$7, 680, 192. 26	\$3, 671, 170. 64
Domestic bullion, refinery bars.....	.....	.....	.....	10, 235, 798. 75	5, 946, 953. 58
Domestic bullion, refined.....	.....	23, 014, 459. 89	.....	13, 518, 967. 71	8, 142, 941. 53
Total domestic bullion...	112, 893. 00	27, 133, 197. 08	3, 560. 06	31, 434, 958. 72	17, 761, 065. 75
Domestic coin, mutilated and abraded.....	236, 014. 03	4, 762. 59	36, 600. 82	753, 629. 45	154. 75
Domestic coin, Treasury trans- fers.....	330, 771. 16	5, 282. 60	.....	.....	.....
Foreign bullion, unrefined....	85, 496. 09	3, 123, 411. 20	304, 204. 87	2, 804, 116. 54	8, 440. 56
Foreign bullion, refined.....	.....	369, 565. 12	.....	5, 975, 180. 65	.....
Foreign coin.....	1, 289. 25	12, 981, 275. 94	3, 036. 93	6, 146, 107. 55	.....
Jewelers' bars, old plate, etc...	701, 097. 82	27, 716. 00	61, 616. 80	2, 272, 264. 21	32, 873. 77
Total deposits.....	1, 467, 561. 35	43, 645, 210. 53	409, 019. 48	49, 386, 257. 12	17, 802, 534. 83
Redeposits:	.....	.....	.....	.....	.....
Fine bars.....	22, 467, 528. 02	.....	.....	.....	.....
Mint bars.....	31, 161, 908. 41	.....	.....	.....	.....
Unparted bars.....	14, 257, 023. 89	12, 409, 361. 47	93. 28	1, 338. 73	1, 689. 56
Total redeposits.....	67, 886, 460. 32	12, 409, 361. 47	93. 28	1, 338. 73	1, 689. 56
Total gold operated upon.	69, 354, 021. 67	56, 054, 572. 00	409, 112. 76	49, 387, 595. 85	17, 804, 224. 39
SILVER.					
Domestic bullion, unrefined...	7, 699. 90	50, 008. 86	215. 77	267, 871. 00	72, 545. 36
Domestic bullion, refinery bars.....	.....	.....	.....	84, 198. 86	7, 424. 66
Domestic bullion, refined.....	10, 656. 65	.....	.....	6, 317, 867. 56	.....
Total domestic bullion...	18, 356. 55	50, 008. 86	215. 77	6, 669, 937. 42	79, 970. 02
Domestic coin, mutilated and abraded.....	2, 800. 78	84. 57	462. 27	348. 73	.....
Domestic coin, Treasury trans- fers.....	3, 626, 876. 94	277, 603. 43	943, 007. 65	.....	.....
Trade dollars.....	263. 22	.....	8. 08	.....	.....
Foreign bullion, unrefined....	1, 436. 52	96, 218. 19	3, 981. 37	702, 962. 21	114. 03
Foreign bullion, refined.....	.....	.....	.....	5, 019. 03	.....
Foreign coin.....	297. 32	17, 750. 41	38. 94	31, 530. 40	.....
Jewelers' bars, old plate, etc...	82, 847. 16	559. 16	6, 953. 60	583, 856. 80	730. 93
Total deposits.....	3, 732, 878. 49	442, 224. 62	954, 667. 68	7, 993, 654. 59	80, 814. 98
Redeposits:	.....	.....	.....	.....	.....
Fine bars.....	184, 810. 87	4, 503, 798. 82	14, 993, 399. 41	19, 192. 40	.....
Mint bars.....	18, 777. 27	.....	.....	.....	.....
Unparted bars.....	157, 277. 10	212, 635. 20	. 71	117. 83	38. 68
Standard bars.....	.....	.....	114, 748. 60	.....	.....
Total redeposits.....	360, 865. 24	4, 716, 434. 02	15, 108, 148. 72	19, 310. 23	38. 68
Total silver operated upon.....	4, 093, 743. 73	5, 158, 658. 64	16, 062, 816. 40	8, 012, 964. 82	80, 853. 66

DURING THE CALENDAR YEAR ENDED DECEMBER 31, 1899.

ASSAY OFFICES.							Total.
Carson.	Boise.	Helena.	Charlotte.	St. Louis.	Dead-wood.	Seattle.	
\$169,220.52	\$1,532,505.32	\$1,569,170.30	\$193,048.84	\$37,683.86	\$367,673.90	\$1,205,625.09	\$20,661,570.98
.....	.....	.....	80,458.95	43,299.61	.....	.....	16,306,510.89
.....	.....	.....	.....	2,671.35	.....	.....	44,679,040.48
169,220.52	1,532,505.32	1,569,170.30	273,507.79	83,654.82	367,763.90	1,205,625.09	81,647,122.35
.....	.....	.....	111.78	1,706.53	.....	45.00	1,033,024.95
.....	.....	.....	.....	.....	.....	.....	336,053.76
290.03	1,204.61	268,653.73	.....	1,165.84	.....	11,566,735.13	18,163,768.60
.....	.....	.....	.....	.....	.....	.....	6,344,745.77
463.85	.....	1,244.63	3,637.13	40,395.26	.....	1,047.27	19,131,709.67
.....	.....	.....	.....	.....	.....	.....	3,142,356.74
169,974.40	1,533,709.93	1,839,068.66	277,256.70	126,922.45	367,763.90	12,773,502.49	129,798,781.84
.....	.....	.....	.....	.....	.....	.....	22,467,523.02
.....	264,998.27	.....	.....	.....	.....	.....	31,161,908.41
.....	264,998.27	.....	.....	.....	.....	.....	26,934,505.20
.....	.....	.....	.....	.....	.....	.....	80,563,941.63
169,974.40	1,798,708.20	1,839,068.66	277,256.70	126,922.45	367,763.90	12,773,502.49	210,362,723.47
.....							
7,637.04	30,290.88	29,026.51	1,130.04	341.28	2,537.75	12,624.06	481,928.45
.....	.....	.....	10.03	15.23	.....	.....	91,648.78
.....	.....	.....	.....	.....	.....	.....	6,328,524.21
7,637.04	30,290.88	29,026.51	1,140.07	356.51	2,537.75	12,624.06	6,902,101.44
.....	.....	.....	1.68	.....	.....	.....	3,698.03
.....	.....	.....	.....	.....	.....	.....	4,847,488.02
.....	.....	.....	.....	.....	.....	.....	271.30
3.62	19.14	7,363.49	.....	9.96	.....	185,718.70	997,827.23
.....	.....	.....	.....	.....	.....	.....	5,019.03
7.80	.....	17.56	101.80	805.41	.....	24.95	49,617.07
.....	.....	.....	.....	.....	.....	.....	675,905.17
7,648.46	30,310.02	36,407.56	1,243.55	1,171.88	2,537.75	198,367.71	13,481,927.29
.....	.....	.....	.....	.....	.....	.....	19,701,201.50
.....	3,557.42	.....	.....	.....	.....	.....	18,777.27
.....	.....	.....	.....	.....	.....	.....	373,626.94
.....	.....	.....	.....	.....	.....	.....	114,748.60
.....	3,557.42	.....	.....	.....	.....	.....	20,208,354.31
7,648.46	33,867.44	36,407.56	1,243.55	1,171.88	2,537.75	198,367.71	33,690,281.60

III.—DEPOSITS OF UNREFINED GOLD OF DOMESTIC PRODUCTION, WITH THE STATES AND 0.992) AND REFINED BULLION (FINENESS 0.992 AND OVER) OF DOMESTIC BULLION

	Source.	COINAGE MINTS.			ASSAY OFFICES.	
		Philadel- phia.	San Fran- cisco.	New Or- leans.	New York.	Denver.
		<i>Stand. ozs.</i>	<i>Stand. ozs.</i>	<i>Stand. ozs.</i>	<i>Stand. ozs.</i>	<i>Stand. ozs.</i>
1	Alabama			179.054		
2	Alaska		23,789.151	5.545	371.327	1,002.260
3	Arizona	343.100	24,116.578		320.547	31,216.736
4	California	203.656	161,376.386	.860	234.336	587.986
5	Colorado	271.085	3.605		56,942.082	147,859.087
6	Georgia	1,044.103			40.461	
7	Idaho	238.487	454.888		1,070.003	322.926
8	Indiana	4.482				
9	Kansas	3.726				
10	Maine				192.719	
11	Maryland	30.581				
12	Michigan	.042			4.928	
13	Missouri			5.894		
14	Montana	1,932.765	26.186		25,984.783	246.076
15	Nevada		1,139.727		58,808.227	
16	New Mexico	112.210	114.623		903.006	5,141.716
17	North Carolina	484.962			392.310	
18	Oregon	183.689	7,227.802			36.948
19	South Carolina	15.982				
20	South Dakota	281.835			240,473.080	
21	Utah		2,875.158		27,048.134	8,583.030
22	Vermont				3.143	
23	Virginia	283.711			21.248	
24	Washington		238.183			
25	Wyoming	293.885				2,328.657
26	Other	339.698	19.837			
	Total unrefined	6,067.999	221,382.124	191.353	412,810.334	197,325.422
	Refinery bars (fineness below 0.992)				550,174.183	319,648.755
	Refined bullion (fineness 0.992 and over)		1,237,027.219		726,644.514	437,683.107
	Total gold	6,067.999	1,458,409.343	191.353	1,689,629.031	954,657.284

IV.—DEPOSITS OF UNREFINED GOLD OF DOMESTIC PRODUCTION, WITH THE STATES BELOW 0.992) AND REFINED BULLION (FINENESS 0.992 AND OVER), OF DOMESTIC DECEMBER 31, 1899.

	Source.	COINAGE MINTS.			ASSAY OFFICES.	
		Philadel- phia.	San Fran- cisco.	New Or- leans.	New York.	Denver.
1	Alabama			\$3,331.24		
2	Alaska		\$442,588.86	103.16	\$6,908.41	\$18,646.70
3	Arizona	\$6,383.25	448,680.52		5,963.67	580,776.48
4	California	3,788.95	3,002,351.37	16.00	4,359.74	10,939.27
5	Colorado	5,043.44	67.07		1,059,387.57	2,750,866.74
6	Georgia	19,425.17			752.76	
7	Idaho	4,436.97	8,463.03		19,907.03	6,007.93
8	Indiana	83.39				
9	Kansas	69.32				
10	Maine				3,585.47	
11	Maryland	568.95				
12	Michigan	.78			91.68	
13	Missouri			109.66		
14	Montana	35,958.42	487.18		483,437.83	4,578.16
15	Nevada		21,204.22		1,094,106.55	
16	New Mexico	2,087.63	2,132.52		16,800.11	95,659.83
17	North Carolina	9,022.55			7,298.79	
18	Oregon	3,417.47	134,470.74			687.40
19	South Carolina	297.34				
20	South Dakota	5,243.44			4,473,917.77	
21	Utah		53,491.31		503,221.10	159,684.28
22	Vermont				58.47	
23	Virginia	5,278.34			305.31	
24	Washington		4,431.31			
25	Wyoming	5,467.63				43,323.85
26	Other	6,319.96	369.06			
	Total unrefined	112,893.00	4,118,737.19	3,560.06	7,680,192.26	3,671,170.64
	Refinery bars (fineness below 0.992)				10,235,798.75	5,946,953.58
	Refined bullion (fineness 0.992 and over)		23,014,459.89		13,518,967.71	8,142,941.53
	Total gold	112,893.00	27,133,197.08	3,560.06	31,434,958.72	17,761,065.75

TERRITORIES PRODUCING THE SAME, AND ALSO OF REFINERY BARS (FINENESS BELOW NOT DISTRIBUTED, BY WEIGHT, DURING THE CALENDAR YEAR ENDED DECEMBER 31, 1899.

ASSAY OFFICES.							Total.	
Carson.	Boise.	Helena.	Charlotte.	St. Louis.	Deadwood.	Seattle.		
Stand. ozs.	Stand. ozs.	Stand. ozs.	Stand. ozs.	Stand. ozs.	Stand. ozs.	Stand. ozs.	Stand. ozs.	
.....	.....	97.815	51.136	.....	.....	63,299.817	230.190	1
.....	.....	.....	.....	96.859	.....	.....	88,565.915	2
1,218.441	.....	.....	.....	5.436	.....	.....	56,093.820	3
.....	.....	.....	.....	18.858	.....	.....	163,627.101	4
.....	.....	.....	4,856.789	.....	.....	.....	205,094.717	5
.....	39,018.301	14,295.155	.....	72.906	.....	264.325	5,941.353	6
.....	.....	.....	.....	.....	.....	.....	55,736.991	7
.....	.....	.....	.....	.....	.....	.....	4.482	8
.....	.....	.....	.....	.....	.....	.....	3.726	9
.....	.....	.....	13.685	.....	.....	.....	192.719	10
.....	.....	.....	.....	.....	.....	.....	44.266	11
.....	.....	.....	.....	.....	.....	.....	4.970	12
.....	.....	.....	.....	.....	.....	.....	5.894	13
.....	6,294.404	69,029.925	.....	.....	.....	.....	103,514.139	14
7,877.162	.....	.....	.....	1,010.108	.....	20.891	67,846.007	15
.....	.....	.....	816.102	.....	.....	.....	7,281.663	16
.....	36,898.982	411.616	.....	.....	.....	96.072	1,693.374	17
.....	.....	.....	4,558.507	.....	.....	.....	44,855.109	18
.....	.....	.....	.....	.....	19,767.310	18.098	4,574.489	19
.....	46.640	.....	.....	.....	.....	.....	260,540.323	20
.....	.....	.....	.....	.....	.....	.....	38,552.962	21
.....	.....	.....	80.156	.....	.....	.....	3.143	22
.....	83.178	508.393	.....	.....	.....	1,103.146	385.115	23
.....	30.656	.....	.....	.....	.....	.....	1,932.900	24
.....	.....	.....	.....	821.341	.....	.....	2,653.198	25
.....	.....	.....	.....	.....	.....	.....	1,180.876	26
9,095.603	82,372.161	84,342.904	10,376.375	2,025.508	19,767.310	64,802.349	1,110,559.442	
.....	.....	.....	4,324.669	2,327.354	.....	.....	876,474.961	
.....	.....	.....	.....	143.585	.....	.....	2,401,498.425	
9,095.603	82,372.161	84,342.904	14,701.044	4,496.447	19,767.310	64,802.349	4,388,532.828	

AND TERRITORIES PRODUCING THE SAME, AND ALSO OF REFINERY BARS (FINENESS BULLION NOT DISTRIBUTED, BY VALUE, DURING THE CALENDAR YEAR ENDED

ASSAY OFFICES.							Total.	
Carson.	Boise.	Helena.	Charlotte.	St. Louis.	Deadwood.	Seattle.		
.....	.....	.....	\$951.37	.....	.....	.....	\$4,282.61	1
.....	.....	\$1,819.81	.....	.....	.....	\$1,177,671.01	1,647,737.95	2
.....	.....	.....	.....	\$1,802.03	.....	.....	1,043,605.95	3
\$22,668.67	.....	.....	.....	101.13	.....	.....	3,044,225.13	4
.....	.....	.....	.....	350.84	.....	.....	3,815,715.66	5
.....	.....	.....	90,358.87	.....	.....	.....	110,536.80	6
.....	\$725,921.88	265,956.38	.....	1,356.39	.....	4,917.67	1,036,967.28	7
.....	.....	.....	.....	.....	.....	.....	83.39	8
.....	.....	.....	.....	.....	.....	.....	69.32	9
.....	.....	.....	254.60	.....	.....	.....	3,585.47	10
.....	.....	.....	.....	.....	.....	.....	823.55	11
.....	.....	.....	.....	.....	.....	.....	92.46	12
.....	.....	.....	.....	.....	.....	.....	109.66	13
.....	117,105.19	1,284,277.67	.....	.....	.....	.....	1,925,844.45	14
146,551.85	.....	.....	.....	18,792.71	.....	388.67	1,262,251.29	15
.....	.....	.....	15,183.30	.....	.....	.....	135,472.80	16
.....	686,492.69	7,657.97	84,809.43	.....	.....	1,787.39	31,504.64	17
.....	.....	.....	.....	.....	.....	.....	834,513.66	18
.....	.....	.....	.....	.....	367,763.90	336.71	85,106.77	19
.....	867.72	.....	.....	.....	.....	.....	4,847,261.82	20
.....	.....	.....	1,491.27	.....	.....	.....	717,264.41	21
.....	.....	.....	.....	.....	.....	.....	58.47	22
.....	1,547.50	9,458.47	.....	.....	.....	20,523.64	7,164.92	23
.....	570.34	.....	.....	.....	.....	.....	35,960.92	24
.....	.....	.....	.....	15,280.76	.....	.....	49,361.82	25
.....	.....	.....	.....	.....	.....	.....	21,969.78	26
169,220.52	1,532,505.32	1,569,170.30	193,048.84	37,683.86	367,763.90	1,205,625.09	20,661,570.98	
.....	.....	.....	80,458.95	43,299.61	.....	.....	16,306,510.89	
.....	.....	.....	.....	2,671.35	.....	.....	44,679,040.48	
169,220.52	1,532,505.32	1,569,170.30	273,507.79	83,654.82	367,763.90	1,205,625.09	81,647,122.35	

V.—DEPOSITS OF UNREFINED SILVER OF DOMESTIC PRODUCTION, WITH THE STATES BELOW 0.992) AND REFINED BULLION (FINENESS 0.992 AND OVER) OF DOMESTIC DECEMBER 31, 1899.

Source.		COINAGE MINTS.			ASSAY OFFICES.	
		Philadel- phia.	San Fran- cisco.	New Or- leans.	New York.	Denver.
		Stand. ozs.	Stand. ozs.	Stand. ozs.	Stand. ozs.	Stand. ozs.
1	Alabama			37.76		
2	Alaska		3,312.71	.68	88.48	270.78
3	Arizona	65.06	6,853.37		95.45	11,599.09
4	California	47.87	29,149.26	.16	19.33	170.18
5	Colorado	503.51	.50		7,563.59	44,081.73
6	Georgia	90.31			25.98	
7	Idaho	99.63	100.65		105.27	26.45
8	Indiana	.37				
9	Kansas	.21				
10	Maine				553.17	
11	Maryland	1.38				
12	Michigan	1,496.92			21,456.11	
13	Missouri			146.83		
14	Montana	3,865.78	3.42		48,198.69	24.34
15	Nevada		430.65		87,572.64	
16	New Mexico	20.19	21.69		15,453.42	771.25
17	North Carolina	109.31			57.13	
18	Oregon	8.93	1,356.88			3.74
19	South Carolina	7.91				
20	South Dakota	16.61			48,513.33	
21	Utah		1,660.44		499.01	5,173.56
22	Virginia	13.53			.04	
23	Washington		80.52			
24	Wyoming	31.28				222.55
25	Other	238.30	6.27			
Total unrefined		6,617.10	42,976.36	185.43	230,201.64	62,343.67
Refinery bars (fineness below 0.992)					72,358.40	6,380.57
Refined bullion (fineness 0.992 and over)		9,158.06			5,429,417.43	
Total silver.....		15,775.16	42,976.36	185.43	5,731,977.47	68,724.24

VI.—DEPOSITS OF UNREFINED SILVER OF DOMESTIC PRODUCTION, WITH THE STATES BELOW 0.992) AND REFINED BULLION (FINENESS 0.992 AND OVER) OF DOMESTIC DECEMBER 31, 1899.

Source.		COINAGE MINTS.			ASSAY OFFICES.	
		Philadel- phia.	San Fran- cisco.	New Or- leans.	New York.	Denver.
1	Alabama			\$43.94		
2	Alaska		\$3,854.79	.79	\$102.96	\$315.09
3	Arizona	\$75.71	7,974.83		111.07	13,497.12
4	California	55.70	33,919.14	.19	22.49	198.03
5	Colorado	585.90	.58		8,801.27	51,295.10
6	Georgia	105.09			30.23	
7	Idaho	115.93	117.12		122.50	30.78
8	Indiana	.43				
9	Kansas	.25				
10	Maine				643.69	
11	Maryland	1.61				
12	Michigan	1,741.87			24,967.11	
13	Missouri			170.85		
14	Montana	4,498.36	3.98		56,085.75	28.32
15	Nevada		501.12		101,902.71	
16	New Mexico	23.49	25.24		17,982.16	897.46
17	North Carolina	127.20			66.48	
18	Oregon	10.39	1,578.91			4.35
19	South Carolina	9.20				
20	South Dakota	19.33			56,451.87	
21	Utah		1,932.15		580.66	6,020.14
22	Virginia	15.74			.05	
23	Washington		93.70			
24	Wyoming	36.40				258.97
25	Other	277.30	7.30			
Total unrefined.....		7,699.90	50,008.86	215.77	267,871.00	72,545.36
Refinery bars (fineness below 0.992)					84,198.86	7,424.66
Refined bullion (0.992 and over)		10,656.65			6,317,867.56	
Total silver.....		18,356.55	50,008.86	215.77	6,669,937.42	79,970.02

AND TERRITORIES PRODUCING THE SAME, AND ALSO OF REFINERY BARS (FINENESS BULLION NOT DISTRIBUTED), BY WEIGHT, DURING THE CALENDAR YEAR ENDED

ASSAY OFFICES.							Total.	
Carson.	Boise.	Helena.	Charlotte.	St. Louis.	Deadwood.	Seattle.		
<i>Stand. ozs.</i>	<i>Stand. ozs.</i>	<i>Stand. ozs.</i>	<i>Stand. ozs.</i>	<i>Stand. ozs.</i>	<i>Stand. ozs.</i>	<i>Stand. ozs.</i>		
		9.74	13.92			10,517.13	51.68	1
				84.31			14,199.52	2
604.19				.82			18,697.28	3
				2.54			29,991.81	4
			354.52				52,151.87	5
	12,675.15	2,409.07				15.91	470.81	6
							15,432.13	7
							.37	8
							.21	9
							553.17	10
							1.38	11
							22,953.03	12
	448.68	22,309.66					146.83	13
5,958.89						12.35	74,850.57	14
				78.64			93,974.53	15
			168.35				16,345.19	16
	12,886.07	91.71				10.91	334.79	17
			433.39				14,358.24	18
					2,180.88	3.54	441.30	19
	6.71						50,714.36	20
			.95				7,339.72	21
	12.13	124.48				288.97	14.52	22
	2.49						506.10	23
				126.98			256.32	24
							371.55	25
6,563.08	26,031.23	24,944.66	971.13	293.29	2,180.88	10,848.81	414,157.28	
			8.62	13.09			78,760.68	
							5,438,575.49	
6,563.08	26,031.23	24,944.66	979.75	306.38	2,180.88	10,848.81	5,931,493.45	

AND TERRITORIES PRODUCING THE SAME, AND ALSO OF REFINERY BARS (FINENESS BULLION NOT DISTRIBUTED), BY VALUE, DURING THE CALENDAR YEAR ENDED

ASSAY OFFICES.							Total.	
Carson.	Boise.	Helena.	Charlotte.	St. Louis.	Deadwood.	Seattle.		
			\$16.20				\$60.14	1
		\$11.33				\$12,238.11	16,523.07	2
				\$98.10			21,756.83	3
\$703.06				.95			34,899.56	4
				2.96			60,685.81	5
			412.53				547.85	6
	\$14,749.26	2,803.28				18.51	17,957.38	7
							.43	8
							.25	9
							643.69	10
							1.61	11
							26,708.98	12
	522.10	25,960.33					170.85	13
6,933.98							87,098.84	14
						14.37	109,352.18	15
			195.90	91.51			19,019.86	16
	14,994.70	106.72					389.58	17
			504.30			12.69	16,707.76	18
					2,537.75	4.12	513.50	19
	7.81						59,013.07	20
			1.11				8,540.76	21
	14.11	144.85					16.90	22
	2.90					336.26	588.92	23
							298.27	24
				147.76			432.36	25
7,637.04	30,290.88	29,026.51	1,130.04	341.28	2,537.75	12,624.06	481,928.45	
			10.03	15.23			91,648.78	
							6,328,524.21	
7,637.04	30,290.88	29,026.51	1,140.07	356.51	2,537.75	12,624.06	6,902,101.44	

VII.—BARS MANUFACTURED OF GOLD AND SILVER, BY WEIGHT,

Descriptions.	COINAGE MINTS.			ASSAY OFFICES.	
	Philadel- phia.	San Fran- cisco.	New Orleans.	Carson.	New York.
GOLD.	<i>Stand. ozs.</i>	<i>Stand. ozs.</i>	<i>Stand. ozs.</i>	<i>Stand. ozs.</i>	<i>Stand. ozs.</i>
Fine bars	83,033.961	.....	239.343	.....	1,936,793.724
Mint bars .....	.....	.....	.....	.....	351,694.566
Standard bars .....	.....	.....	.....	.....	144,147.618
Unparted bars	109.572	.....	.....	5,785.460	.....
Total gold	83,143.533	.....	239.343	5,785.460	2,432,635.908
SILVER.	.....	.....	.....	.....	.....
Fine bars	73,290.37	52,757.28	4,798.48	1,084.26	6,796,151.79
Standard bars .....	.....	.....	.....	.....	5,707.95
Unparted bars	27.77	.....	.....	4,938.83	22,459.52
Total silver	73,318.14	52,757.28	4,798.48	6,023.09	6,824,319.26

VIII.—BARS MANUFACTURED OF GOLD AND SILVER, BY VALUE,

Descriptions.	COINAGE MINTS.			ASSAY OFFICES.	
	Philadel- phia.	San Fran- cisco.	New Or- leans.	Carson.	New York.
GOLD.	<i>Dollars.</i>	<i>Dollars.</i>	<i>Dollars.</i>	<i>Dollars.</i>	<i>Dollars.</i>
Fine bars	1,544,817.88	.....	4,452.89	.....	36,033,371.61
Mint bars .....	.....	.....	.....	.....	6,543,154.72
Standard bars .....	.....	.....	.....	.....	2,681,816.14
Unparted bars	2,038.55	.....	.....	107,636.47	.....
Total gold	1,546,856.43	.....	4,452.89	107,636.47	45,258,342.47
SILVER.	.....	.....	.....	.....	.....
Fine bars	85,283.34	61,390.28	5,583.69	1,261.68	7,908,249.36
Standard bars .....	.....	.....	.....	.....	6,641.98
Unparted bars	32.31	.....	.....	5,747.00	26,134.71
Total silver	85,315.65	61,390.28	5,583.69	7,008.68	7,941,026.05
Total gold and silver	1,632,172.08	61,390.28	10,036.58	114,645.15	53,199,368.52

DURING THE CALENDAR YEAR ENDED DECEMBER 31, 1899.

ASSAY OFFICES.							Total.
Denver.	Boise.	Helena.	Charlotte.	St. Louis.	Dead-wood.	Seattle.	
<i>Stand. ozs.</i> 429, 676. 327	<i>Stand. ozs.</i>	<i>Stand. ozs.</i>	<i>Stand. ozs.</i>	<i>Stand. ozs.</i>	<i>Stand. ozs.</i>	<i>Stand. ozs.</i>	<i>Stand. ozs.</i> 2, 449, 743. 355
							351, 694. 566
							144, 147. 618
527, 209. 920	82, 436. 909	98, 849. 941	14, 902. 548	6, 822. 082	19, 767. 310	686, 575. 759	1, 442, 459. 501
956, 886. 247	82, 436. 909	98, 849. 941	14, 902. 548	6, 822. 082	19, 767. 310	686, 575. 759	4, 388, 045. 040
							\$6, 928, 082. 18
							5, 707. 95
69, 450. 38	26, 047. 68	31, 287. 75	1, 068. 68	1, 007. 09	2, 180. 88	170, 472. 26	328, 940. 84
69, 450. 38	26, 047. 68	31, 287. 75	1, 068. 68	1, 007. 09	2, 180. 88	170, 472. 26	7, 262, 730. 97

DURING THE CALENDAR YEAR ENDED DECEMBER 31, 1899.

ASSAY OFFICES.							Total.
Denver.	Boise.	Helena.	Charlotte.	St. Louis.	Dead-wood.	Seattle.	
<i>Dollars.</i> 7,993,978.18	<i>Dollars.</i>	<i>Dollars.</i>	<i>Dollars.</i>	<i>Dollars.</i>	<i>Dollars.</i>	<i>Dollars.</i>	<i>Dollars.</i> 45,576,620.56
							6,543,154.72
9,808,556.65	1,533,709.93	1,839,068.66	277,256.70	126,922.45	367,763.90	12,773,502.49	2,681,816.14
							26,836,455.80
17,802,534.83	1,533,709.93	1,839,068.66	277,256.70	126,922.45	367,763.90	12,773,502.49	81,638,047.22
							8,061,768.35
							6,641.98
80,814.98	30,310.02	36,407.56	1,243.55	1,171.88	2,537.75	198,367.71	382,767.47
80,814.98	30,310.02	36,407.56	1,243.55	1,171.88	2,537.75	198,367.71	8,451,177.80
17,883,349.81	1,564,019.95	1,875,476.22	278,500.25	128,094.33	370,301.65	12,971,870.20	90,089,225.02

IX.—STATEMENT OF DOMESTIC MUTILATED AND UNCURRENT GOLD AND SILVER COINS
SHOWING WEIGHT, FACE VALUE, COINING VALUE, AND LOSS,

Denominations.	PHILADELPHIA.		SAN FRANCISCO.		NEW ORLEANS.	
	Received from Treas- ury.	Purchased.	Received from Treas- ury.	Purchased.	Received from Treas- ury.	Purchased.
GOLD.						
Double eagles	\$105,440.00	\$73,780.00	\$2,220.00	\$2,380.00	.....	\$12,920.00
Eagles	76,920.00	47,300.00	900.00	960.00	.....	7,050.00
Half eagles	145,815.00	112,775.00	2,255.00	1,845.00	.....	16,400.00
Three-dollar pieces	81.00	84.00	.....	18.00	.....	3.00
Quarter eagles	4,890.00	3,665.00	7.50	65.00	.....	650.00
Dollars	86.00	325.00	1.00	24.00	.....	73.00
Total gold, face value	333,232.00	237,929.00	5,383.50	5,292.00	.....	37,096.00
SILVER.						
Trade dollars .....	.....	260.00	.....	.....	.....	8.00
Standard dollars .....	.....	1,099.00	.....	10.00	.....	190.00
Half dollars	1,598,957.00	780.50	189,500.00	43.00	\$569,060.00	91.50
Quarter dollars	1,738,661.50	634.50	84,000.00	17.00	390,139.75	87.25
Twenty-cent pieces	585.60	.....	27.80	.....	94.80	.40
Dimes	771,879.00	421.30	38,000.00	26.20	114,298.80	89.00
Half dimes	2,427.15	49.15	68.65	.50	233.20	70.80
Three-cent pieces	216.45	10.80	5.58	.....	3.45	.12
Total silver, face value	4,112,726.70	3,255.25	311,602.03	96.70	1,073,830.00	537.07
SUMMARY.						
Gold coin	<i>Stand. ozs.</i> 17,778.950	<i>Stand. ozs.</i> 12,685.754	<i>Stand. ozs.</i> 283.940	<i>Stand. ozs.</i> 255.989	<i>Stand. ozs.</i>	<i>Stand. ozs.</i> 1,967.294
Silver coin	3,116,847.37	2,633.12	238,565.45	72.68	810,397.20	404.20
Gold, coining value....	\$330,771.16	\$236,014.03	\$5,282.60	\$4,762.59	.....	\$36,600.82
Silver, subsidiary, coin- ing value	3,877,881.61	3,276.04	296,815.50	90.43	\$1,008,270.23	502.90
Silver, dollar, coining value	3,626,876.94	3,064.00	277,603.43	84.57	943,007.65	470.35
Loss, gold	2,460.84	1,914.97	100.90	529.41	.....	495.18
Loss, silver	234,845.09	.....	14,786.53	6.27	65,559.77	34.17
Gain, silver .....	.....	20.79	.....	.....	.....	.....

TRANSFERRED FROM THE TREASURY AND PURCHASED OVER THE COUNTER FOR RECOINAGE,
DURING THE CALENDAR YEAR ENDED DECEMBER 31, 1899.

NEW YORK.	DENVER.	ST. LOUIS.	SEATTLE.	CHAR- LOTTE.	TOTAL.		
Purchased.	Pur- chased.	Pur- chased.	Pur- chased.	Purchased.	Received from Treas- ury.	Purchased.	Received from Treas- ury and purchased.
\$183,020.00	\$100.00	\$1,260.00	\$40.00	\$60.00	\$107,660.00	\$273,560.00	\$381,220.00
301,700.00	30.00	290.00	-----	30.00	77,820.00	357,360.00	435,180.00
255,070.00	20.00	165.00	5.00	15.00	148,070.00	386,295.00	534,365.00
156.00	3.00	-----	-----	6.00	81.00	270.00	351.00
20,482.50	5.00	10.00	-----	-----	4,897.50	24,877.50	29,775.00
43.00	-----	1.00	-----	1.00	87.00	467.00	554.00
760,471.50	158.00	1,726.00	45.00	112.00	338,615.50	1,042,829.50	1,381,445.00
5.00	-----	-----	-----	-----	-----	273.00	273.00
57.00	-----	-----	-----	1.00	-----	1,357.00	1,357.00
103.00	-----	-----	-----	.50	2,357,517.00	1,018.50	2,358,535.50
69.50	-----	-----	-----	.25	2,212,801.25	808.50	2,213,609.75
-----	-----	-----	-----	-----	708.20	.40	708.60
160.00	-----	-----	-----	-----	924,177.80	696.50	924,874.30
4.80	-----	-----	-----	-----	2,729.00	225.25	2,854.25
.45	-----	-----	-----	-----	225.48	11.37	236.85
399.75	-----	-----	-----	1.75	5,498,158.73	4,290.52	5,502,449.25
Stand. ozs. 40,507.583	Stand. ozs. 8,318	Stand. ozs. 91.726	Stand. ozs. 2.418	Stand. ozs. 6.088	Stand. ozs. 18,062.890	Stand. ozs. 55,525.090	Stand. ozs. 73,587.980
299.69	-----	-----	-----	1.45	4,165,810.02	3,411.14	4,169,221.16
\$753,629.45	\$154.75	\$1,706.53	\$45.00	\$111.78	\$336,053.76	\$1,033,024.95	\$1,369,078.71
372.86	-----	-----	-----	1.80	5,182,967.34	4,244.03	5,187,211.37
348.73	-----	-----	-----	1.68	4,847,488.02	3,969.33	4,851,457.35
6,842.05	3.25	19.47	-----	.22	2,561.74	9,804.55	12,366.29
26.89	-----	-----	-----	-----	315,191.39	46.49	315,237.88
-----	-----	-----	-----	.05	-----	20.84	20.84

X.—QUANTITY AND COST OF SILVER USED IN THE COINAGE OF SILVER DOLLARS, DOLLARS COINED, AND SEIGNIORAGE ON THE SAME, DURING THE CALENDAR YEAR 1899, UNDER ACT OF JULY 14, 1890.

MINT AT PHILADELPHIA.

Months.	Used in coinage.		Dollars coined.	Seigniorage.
	Standard ounces.	Cost.		
1899.				
January.....				
February.....	65,312.50	\$53,184.86	76,000	\$22,815.14
March.....	258.67	210.64	301	90.36
April.....				
May.....	183,906.25	149,757.19	214,000	64,242.81
June.....	62.73	51.08	73	21.92
July.....				
August.....				
September.....	124.61	101.47	145	43.53
October.....				
November.....				
December.....	34,656.02	28,220.92	40,327	12,106.08
Total.....	284,320.78	231,526.16	330,846	99,319.84

MINT AT SAN FRANCISCO.

1899.				
January.....	288,750.00	\$232,730.64	336,000	\$103,269.36
February.....	288,750.00	233,868.50	336,000	102,131.50
March.....	472,656.25	384,194.03	550,000	165,805.97
April.....	244,062.50	198,627.53	284,000	85,372.47
May.....	429,687.50	349,401.26	500,000	150,598.74
June.....	438,281.25	356,473.24	510,000	153,526.76
July.....	39,531.25	32,145.61	46,000	13,854.39
August.....				
September.....				
October.....				
November.....				
December.....				
Total.....	2,201,718.75	1,787,440.81	2,562,000	774,559.19

MINT AT NEW ORLEANS.

1899.				
January.....	1,031,250.00	\$829,056.51	1,200,000	\$360,943.49
February.....	945,312.50	769,135.13	1,100,000	330,864.87
March.....	1,160,156.25	944,381.76	1,350,000	405,618.24
April.....	1,160,156.25	944,562.39	1,350,000	405,437.61
May.....	1,289,062.50	1,049,608.13	1,500,000	450,391.87
June.....	601,562.50	489,845.97	700,000	210,154.03
July.....	309,375.00	251,920.79	360,000	108,079.21
August.....	713,281.25	580,822.39	830,000	249,177.61
September.....	747,656.25	608,817.08	870,000	261,182.92
October.....	859,375.00	699,789.94	1,000,000	300,210.06
November.....	816,406.25	664,804.61	950,000	285,195.39
December.....	928,125.00	755,777.95	1,030,000	324,222.05
Total.....	10,561,718.75	8,598,522.65	12,290,000	3,691,477.35

SUMMARY.

1899.				
January.....	1,320,000.00	\$1,071,787.15	1,536,000	\$464,212.85
February.....	1,299,375.00	1,056,188.49	1,512,000	455,811.51
March.....	1,633,071.17	1,328,786.43	1,900,301	571,514.57
April.....	1,404,218.75	1,143,189.92	1,634,000	490,810.08
May.....	1,902,656.25	1,548,766.58	2,214,000	665,233.42
June.....	1,039,906.48	846,370.29	1,210,073	363,702.71
July.....	348,906.25	284,066.40	406,000	121,933.60
August.....	713,281.25	580,822.39	830,000	249,177.61
September.....	747,780.86	608,918.55	870,145	261,226.45
October.....	859,375.00	699,789.94	1,000,000	300,210.06
November.....	816,406.25	664,804.61	950,000	285,195.39
December.....	962,781.02	783,998.87	1,120,327	336,328.13
Total.....	13,047,758.28	10,617,489.62	15,182,846	4,565,356.38

XI.—QUANTITY AND COST OF METAL OBTAINED BY TRANSFER AND PURCHASE FOR SUBSIDIARY SILVER COINAGE AND COINAGE DERIVED THEREFROM DURING THE CALENDAR YEAR 1899.

Sources from which bullion was obtained.	Standard ounces.	Cost.	Coinage.
MINT AT PHILADELPHIA.			
Worn and uncurrent coins	3,116,847.37	\$3,877,881.61	\$4,192,000.00
Partings, charges, and fractions purchased <i>a</i>	1,015,406.71	767,596.55	
Amount transferred from act July 14, 1890	2,449,369.74	1,994,251.88	3,691,719.10
Melted assay coins purchased	964.36	1,147.43	
Mutilated coins purchased	1,430.90	733.62	
Surplus bullion purchased	13,559.22	7,246.66	
Total	6,597,578.30	6,648,857.75	7,883,719.10
MINT AT SAN FRANCISCO.			
Worn and uncurrent coins	238,565.45	296,815.50	695,071.20
Partings, charges, and fractions purchased	251,538.22	128,811.23	
Amount transferred from Philadelphia mint	582,250.00	621,635.64	511,883.60
Amount transferred from Carson mint	8,515.74	4,573.30	
Transferred from silver recoinage account	.08	.09	
Mutilated coins purchased	72.68	37.09	
Surplus bullion purchased	5,670.56	2,895.64	
Total	1,086,612.73	1,054,768.49	1,206,954.80
MINT AT NEW ORLEANS.			
Worn and uncurrent coins	810,397.20	1,008,270.23	1,249,000.00
Partings, charges, and fractions purchased	12,632.99	6,702.76	
Amount transferred from Philadelphia mint	522,437.50	460,088.36	539,000.00
Amount transferred from act July 14, 1890	30,957.18	25,208.46	
Mutilated coins purchased	313.30	159.68	
Surplus bullion purchased	8.07	4.04	
Total	1,376,746.24	1,500,433.53	1,788,000.00
MINT AT CARSON.			
Partings, charges, and fractions purchased	549.98	275.07	
Surplus bullion purchased	463.10	248.35	
Total	1,013.08	523.42	
SUMMARY.			
Worn and uncurrent coins	4,165,810.02	5,182,967.34	6,136,071.20
Partings, charges, and fractions purchased	1,280,127.90	903,385.61	
Amount transferred from act July 14, 1890	2,480,326.92	2,019,460.34	4,742,602.70
Amount transferred from mint at Philadelphia to mint at San Francisco	582,250.00	621,635.64	
Amount transferred from mint at Philadelphia to mint at New Orleans	522,437.50	460,088.36	
Amount transferred from mint at Carson to mint at San Francisco	8,515.74	4,573.30	
Amount transferred from silver recoinage account	.08	.09	
Melted assay coins purchased	964.36	1,147.43	
Mutilated coins purchased	1,816.88	930.39	
Surplus bullion purchased	19,700.95	10,394.69	
Total	9,061,950.35	9,204,583.19	10,878,673.90

a Of this amount 689,906.46 standard ounces, costing \$592,517.20, were received by transfer from United States assay office at New York.

XII.—SILVER FOR SUBSIDIARY COINAGE, CALENDAR YEAR 1899.

Stock.	Standard ounces.	Cost.
MINT AT PHILADELPHIA.		
Silver bullion on hand Jan. 1, 1899	965,264.34	\$1,038,111.92
Uncurrent coins transferred from Treasury	3,116,847.37	3,877,881.61
Partings, charges, and fractions purchased <i>a</i>	1,015,406.71	767,596.55
Amount transferred from act July 14, 1890	2,449,369.74	1,994,251.88
Melted assay coins purchased	964.36	1,147.43
Mutilated coins purchased	1,430.90	733.62
Surplus bullion purchased	13,559.22	7,246.66
Total	7,562,842.64	7,686,969.67
Used in coinage calendar year 1899	6,336,539.22	6,483,249.15
Amount transferred to San Francisco mint	582,250.00	621,635.64
Amount transferred to New Orleans mint	522,437.50	460,088.36
Sold in sweeps	6,430.15	3,343.10
Wasted by operative officers	5,531.81	2,956.45
Balance on hand Jan. 1, 1900	109,653.96	115,696.97
Total	7,562,842.64	7,686,969.67
MINT AT SAN FRANCISCO.		
Silver bullion on hand Jan. 1, 1899	1,625.17	826.26
Uncurrent coins transferred from Treasury	238,565.45	296,815.50
Partings, charges, and fractions purchased	251,538.22	128,811.23
Transferred from Philadelphia mint	582,250.00	621,635.64
Transferred from Carson mint	8,515.74	4,573.30
Transferred from silver recoinage account	.08	.09
Melted assay coins purchased	72.68	37.09
Mutilated coins purchased	5,670.56	2,895.64
Surplus bullion purchased		
Total	1,088,237.90	1,055,594.75
Used in coinage calendar year 1899	970,089.91	960,350.71
Amount transferred to subsidiary silver purchase account	.08	.09
Sold in sweeps	3,436.30	1,735.16
Wasted by operative officers	1,316.64	672.33
Balance on hand Jan. 1, 1900	113,394.97	92,836.46
Total	1,088,237.90	1,055,594.75
MINT AT NEW ORLEANS.		
Silver bullion on hand Jan. 1, 1899	121,820.08	149,687.47
Uncurrent coins transferred from Treasury	810,397.20	1,008,270.23
Partings, charges, and fractions purchased	12,632.99	6,702.76
Amount transferred from mint at Philadelphia	522,437.50	460,088.36
Amount transferred from act July 14, 1890	30,957.18	25,208.46
Melted assay coins purchased	313.30	159.68
Mutilated coins purchased	8.07	4.04
Surplus bullion purchased		
Total	1,498,566.32	1,650,121.00
Used in coinage calendar year 1899	1,437,105.00	1,600,542.91
Sold in sweeps	8,689.33	4,404.16
Wasted by operative officers	6,349.67	3,330.25
Balance on hand Jan. 1, 1900	46,422.32	41,843.68
Total	1,498,566.32	1,650,121.00
MINT AT CARSON.		
Silver bullion on hand Jan. 1, 1899	9,372.57	5,074.20
Uncurrent coins transferred from Treasury		
Partings, charges, and fractions purchased	549.98	275.07
Melted assay coins		
Mutilated coins purchased		
Surplus bullion purchased	463.10	248.35
Total	10,385.65	5,597.62
Used in coinage calendar year 1899		
Amount transferred to San Francisco mint	9,688.04	5,220.74
Amount transferred to act July 14, 1890	3.20	2.30
Sold in sweeps	694.41	374.58
Balance on hand Jan. 1, 1900		
Total	10,385.65	5,597.62

a Of this amount 689,906.46 standard ounces, costing \$592,517.20, were received by transfer from United States assay office at New York.

XII.—SILVER FOR SUBSIDIARY COINAGE, CALENDAR YEAR 1899—Continued.

Stock.	Standard ounces.	Cost.
SUMMARY.		
Silver bullion on hand Jan. 1, 1899.....	1,098,082.16	\$1,193,699.85
Uncurrent coins transferred from Treasury	4,165,810.02	5,182,967.34
Partings, charges, and fractions purchased	1,280,127.90	903,385.61
Amount transferred from act July 14, 1890.....	2,480,326.92	2,019,460.34
Amount transferred from mint at Philadelphia to mint at San Francisco	582,250.00	621,635.64
Amount transferred from mint at Philadelphia to mint at New Orleans	522,437.50	460,088.36
Amount transferred from mint at Carson to mint at San Francisco...	8,515.74	4,573.30
Amount transferred from silver recoinage account	.08	.09
Melted assay coins purchased	964.36	1,147.43
Mutilated coins purchased	1,816.88	930.39
Surplus bullion purchased.....	19,700.95	10,394.69
Total.....	10,160,032.51	10,398,283.04
Used in coinage calendar year 1899.....	8,743,734.13	9,044,142.77
Amount transferred to San Francisco mint	591,938.04	626,856.38
Amount transferred to New Orleans mint.....	522,437.50	460,088.36
Amount transferred to subsidiary purchase account	.08	.09
Amount transferred to act July 14, 1890.....	3.20	2.30
Sold in sweeps.....	19,250.19	9,857.00
Wasted by operative officers.....	13,198.12	6,959.03
Balance on hand Jan. 1, 1900.....	269,471.25	250,377.11
Total.....	10,160,032.51	10,398,283.04

XIII.—COINAGE EXECUTED AT THE MINTS OF THE UNITED

Denominations.	PHILADELPHIA.	
	Pieces.	Value.
GOLD.		
Double eagles	1,669,384	\$33,387,680.00
Eagles.....	1,262,305	12,623,050.00
Half eagles	1,710,729	8,553,645.00
Quarter eagles.....	27,350	68,375.00
Total gold.....	4,669,768	54,632,750.00
SILVER.		
Dollars, act of July 14, 1890.....	330,846	330,846.00
Subsidiary:		
Half dollars.....	5,538,846	2,769,423.00
Quarter dollars	12,624,846	3,156,211.50
Dimes	19,580,846	1,958,084.60
Total subsidiary	37,744,538	7,883,719.10
Total silver.....	38,075,384	8,214,565.10
MINOR.		
Five-cent nickels.....	26,029,031	1,301,451.55
One-cent bronze.....	53,600,031	536,000.31
Total minor	79,629,062	1,837,451.86
Total coinage.....	122,374,214	64,684,766.96

The mint at Philadelphia coined, in addition to the above, for the Government of Costa Rica:

20-colon pieces, gold	25,000
10-colon pieces, gold	50,000
5-colon pieces, gold	100,000
	175,000
Value	\$698,023.26

For the Government of Santo Domingo, 240,395 silver pesos.

STATES DURING THE CALENDAR YEAR ENDED DECEMBER 31, 1899.

SAN FRANCISCO.		NEW ORLEANS.		TOTAL.	
Pieces.	Value.	Pieces.	Value.	Pieces.	Value.
2,010,300	\$40,206,000.00	.....	.....	3,679,684	\$73,593,680.00
841,000	8,410,000.00	37,047	\$370,470.00	2,140,352	21,403,520.00
1,545,000	7,725,000.00	.....	.....	3,255,729	16,278,645.00
.....	.....	.....	.....	27,350	68,375.00
4,396,300	56,341,000.00	37,047	370,470.00	9,103,115	111,344,220.00
.....					
2,562,000	2,562,000.00	12,290,000	12,290,000.00	15,182,846	15,182,846.00
.....					
1,686,411	843,205.50	1,724,000	862,000.00	8,949,257	4,474,628.50
708,000	177,000.00	2,644,000	661,000.00	15,976,846	3,994,211.50
1,867,493	186,749.30	2,650,000	265,000.00	24,098,339	2,409,833.90
4,261,904	1,206,954.80	7,018,000	1,788,000.00	49,024,442	10,878,673.90
6,823,904	3,768,954.80	19,308,000	14,078,000.00	64,207,288	26,061,519.90
.....					
.....	.....	.....	.....	26,029,031	1,301,451.55
.....	.....	.....	.....	53,600,031	536,000.31
.....					
.....	.....	.....	.....	79,629,062	1,837,451.86
11,220,204	60,109,954.80	19,345,047	14,448,470.00	152,939,465	139,243,191.76

Coinage of silver dollars:

Act of February 28, 1878 (Bland-Allison).....	\$378,166,793
Act of July 14, 1890 (Sherman), as follows:	
From July 14, 1890, to date of repeal of purchasing clause of Sherman	
act, October 31, 1893.....	\$36,087,285
From November 1, 1893, to June 12, 1898.....	42,139,872
Coined under war-revenue bill approved June 13, 1898.....	23,955,281
Act of March 3, 1891, recoinage of trade dollars	102,182,438
Total.....	485,427,70

XIV.—ASSETS AND LIABILITIES OF THE UNITED
ASSETS.

Institutions.	Gold bullion.		Silver bullion.		Value of bul- lion shipped for coinage.
	Standard ounces.	Value.	Standard ounces.	Value (cost).	
COINAGE MINTS.					
Philadelphia.....	3,906,163.844	\$72,672,815.90	91,430,181.93	\$74,479,376.76	-----
San Francisco	170,138.260	3,165,362.92	1,656,622.88	1,349,443.33	-----
New Orleans.....	38,471.003	715,739.69	3,633,369.51	2,962,717.06	-----
ASSAY OFFICES.					
New York.....	3,543,513.764	65,925,837.56	769,157.70	623,377.16	-----
Carson	230.431	4,287.11	2,736.33	1,448.47	\$24,608.14
Denver.....	18,494.419	344,082.22	1,161.60	615.65	429,530.89
Helena.....	2,495.283	46,423.87	722.55	382.95	45,621.87
Boise.....	1,670.759	31,083.89	749.92	397.46	77,617.96
Charlotte	1,285.460	23,915.54	98.72	52.32	-----
St. Louis.....	525.978	9,785.65	104.78	55.42	-----
Deadwood	425.751	7,918.53	58.72	28.28	27,847.83
Seattle	7,035.500	130,893.02	1,744.56	924.62	320,003.53
Total.....	7,690,450.452	143,078,145.90	97,496,709.20	79,418,819.48	925,230.22

LIABILITIES.

Institutions.	Bullion fund.	Undeposited earnings.
COINAGE MINTS.		
Philadelphia	\$230,469,540.75	.....
San Francisco	70,977,394.44	.....
New Orleans	20,282,169.14	.....
ASSAY OFFICES.		
New York.....	68,444,496.58	\$42,640.17
Carson.....	179,515.69	202.28
Denver.....	1,176,976.74	2,362.80
Helena.....	150,519.95	1,382.23
Boise.....	174,053.45	933.29
Charlotte.....	36,175.10	212.71
St. Louis.....	30,715.70	108.96
Deadwood.....	96,532.51	185.43
Seattle	1,198,755.71	5,761.12
Total	393,216,845.76	53,788.99

STATES MINTS AND ASSAY OFFICES, DECEMBER 31, 1899.

ASSETS.

Gold coin.	Silver coin.	Credit balance with assistant treasurer and depository banks.	Minor coin.	Minor coinage metal.	Deficiencies.	Total.
\$14,192,275.00	\$69,659,265.64	-----	\$305,592.20	\$96,393.69	\$13,543.82	\$231,419,263.01
14,950,125.00	51,731,106.68	-----			413,557.96	71,609,595.89
346,660.00	16,605,026.07	-----			25,000.00	20,655,142.82
18,573.93	3,502.09	<i>a</i> \$2,001,915.93	-----	-----	-----	68,573,206.67
11,064.59	12,177.65	<i>b</i> 50,582.26	-----	-----	75,549.75	179,717.97
-----	-----	405,110.78	-----	-----	-----	1,179,339.54
-----	-----	59,473.49	-----	-----	-----	151,902.18
-----	-----	65,887.43	-----	-----	-----	174,986.74
-----	-----	12,419.95	-----	-----	-----	36,387.81
-----	-----	20,983.59	-----	-----	-----	30,824.66
-----	-----	60,923.30	-----	-----	-----	96,717.94
-----	-----	753,420.57	-----	-----	-----	1,205,241.74
29,518,698.52	138,011,078.13	3,430,717.30	305,592.20	96,393.69	527,651.53	395,312,326.97

a Gold coin, \$1,961,076.93; silver coin, \$40,839.

b Gold coin.

LIABILITIES.

Seigniorage on silver.	Unpaid deposi- tors.	Minor coinage profits.	Minor coin metal fund.	Unpaid cent depositors and subtreasury transfers.	Total.
\$24,348.69	\$523,387.68	\$196,419.64	\$49,245.30	\$156,320.95	\$231,419,263.01
134,051.68	498,149.77	-----	-----	-----	71,609,595.89
372,899.89	73.79	-----	-----	-----	20,655,142.82
-----	86,069.92	-----	-----	-----	68,573,206.67
-----	-----	-----	-----	-----	179,717.97
-----	-----	-----	-----	-----	1,179,339.54
-----	-----	-----	-----	-----	151,902.18
-----	-----	-----	-----	-----	174,986.74
-----	-----	-----	-----	-----	36,387.81
-----	-----	-----	-----	-----	30,824.66
-----	-----	-----	-----	-----	96,717.94
-----	724.91	-----	-----	-----	1,205,241.74
531,300.26	1,108,406.07	196,419.64	49,245.30	156,320.95	395,312,326.97

XV.—UNREFINED GOLD AND SILVER OF DOMESTIC PRODUCTION, BY VALUE, ITS DISTRIBUTION, BY STATES AND TERRITORIES; ALSO REFINED DOMESTIC BULLION (NOT DISTRIBUTED) DEPOSITED AT THE MINTS AND ASSAY OFFICES FROM THEIR ORGANIZATION TO THE CLOSE OF THE CALENDAR YEAR ENDED DECEMBER 31, 1899.

Localities.	Gold.	Silver.	Total.
Alabama	\$269,890.01	\$598.36	\$270,488.37
Alaska	4,613,985.12	51,101.93	4,665,087.05
Arizona	10,694,295.87	14,154,335.89	24,848,631.76
California	782,538,322.48	4,460,500.13	786,998,822.61
Connecticut	125.82	.....	125.82
Colorado	82,322,484.64	25,113,441.99	107,435,926.63
Georgia	9,848,931.15	10,059.37	9,858,990.52
Idaho	40,260,416.40	2,054,765.33	42,315,181.73
Indiana	83.39	.43	83.82
Iowa	1,318.17	8.03	1,326.20
Kansas	69.32	.25	69.57
Maine	35,703.62	3,719.21	39,422.83
Maryland	19,422.86	44.27	19,467.13
Michigan	502,146.31	4,241,926.21	4,744,072.52
Minnesota	9,048.14	116.27	9,164.41
Missouri	206.37	529.96	736.33
Montana	82,976,609.95	22,403,033.96	105,379,643.91
Nebraska	2,340.26	273,226.13	275,566.39
Nevada	42,277,554.23	105,539,975.10	147,817,529.33
New Hampshire	481.34	1.75	483.09
New Mexico	6,904,605.39	7,178,292.81	14,082,898.20
New York	1,058.83	.62	1,059.45
North Carolina	12,020,483.21	69,197.10	12,089,680.31
Oregon	25,495,040.06	147,580.66	25,642,620.72
South Carolina	2,701,567.76	6,057.04	2,707,624.74
South Dakota	71,969,158.91	1,302,146.27	73,271,305.18
Tennessee	92,371.62	17.63	92,389.25
Texas	10,566.56	3,461.77	14,028.33
Utah	3,043,333.19	19,959,969.15	23,003,302.34
Vermont	79,850.34	93.68	79,944.02
Virginia	1,782,549.20	509.99	1,783,059.19
Washington	1,607,500.04	23,320.27	1,630,820.31
West Virginia	243.74	3.72	247.46
Wisconsin	1,109.77	38.54	1,148.31
Wyoming	954,460.21	13,859.92	968,320.13
Other sources	42,206,959.63	42,962,857.36	85,169,816.99
Unrefined	1,225,244,293.85	249,974,791.10	1,475,219,084.95
Refined	696,406,550.37	556,748,045.38	1,253,154,595.75
Total	1,921,650,844.22	806,722,836.48	2,728,373,680.70

XVI.—PRODUCT OF GOLD AND SILVER IN THE UNITED STATES FROM 1792 TO 1844,
AND ANNUALLY SINCE.

[The estimate for 1792-1873 is by R. W. Raymond, commissioner, and since by Director of the Mint.]

Years.	Gold.	Silver.	Total.
Apr. 2, 1792-July 31, 1834.....	\$14,000,000	Insignificant.	\$14,000,000
July 31, 1834-Dec. 31, 1844.....	7,500,000	\$250,000	7,750,000
1845.....	1,008,000	50,000	1,058,000
1846.....	1,140,000	50,000	1,190,000
1847.....	889,000	50,000	939,000
1848.....	10,000,000	50,000	10,050,000
1849.....	40,000,000	50,000	40,050,000
1850.....	50,000,000	50,000	50,050,000
1851.....	55,000,000	50,000	55,050,000
1852.....	60,000,000	50,000	60,050,000
1853.....	65,000,000	50,000	65,050,000
1854.....	60,000,000	50,000	60,050,000
1855.....	55,000,000	50,000	55,050,000
1856.....	55,000,000	50,000	55,050,000
1857.....	55,000,000	50,000	55,050,000
1858.....	50,000,000	500,000	50,500,000
1859.....	50,000,000	100,000	50,100,000
1860.....	46,000,000	150,000	46,150,000
1861.....	43,000,000	2,000,000	45,000,000
1862.....	39,200,000	4,500,000	43,700,000
1863.....	40,000,000	8,500,000	48,500,000
1864.....	46,100,000	11,000,000	57,100,000
1865.....	53,225,000	11,250,000	64,475,000
1866.....	53,500,000	10,000,000	63,500,000
1867.....	51,725,000	13,500,000	65,225,000
1868.....	48,000,000	12,000,000	60,000,000
1869.....	49,500,000	12,000,000	61,500,000
1870.....	50,000,000	16,000,000	66,000,000
1871.....	43,500,000	23,000,000	66,500,000
1872.....	36,000,000	28,750,000	64,750,000
1873.....	36,000,000	35,750,000	71,750,000
1874.....	33,500,000	37,300,000	70,800,000
1875.....	33,400,000	31,700,000	65,100,000
1876.....	39,900,000	38,800,000	78,700,000
1877.....	46,900,000	39,800,000	86,700,000
1878.....	51,200,000	45,200,000	96,400,000
1879.....	38,900,000	40,800,000	79,700,000
1880.....	36,000,000	39,200,000	75,200,000
1881.....	34,700,000	43,000,000	77,700,000
1882.....	32,500,000	46,800,000	79,300,000
1883.....	30,000,000	46,200,000	76,200,000
1884.....	30,800,000	48,800,000	79,600,000
1885.....	31,800,000	51,600,000	83,400,000
1886.....	35,000,000	51,000,000	86,000,000
1887.....	33,000,000	53,350,000	86,350,000
1888.....	33,175,000	59,195,000	92,370,000
1889.....	32,800,000	64,646,000	97,446,000
1890.....	32,845,000	70,465,000	103,310,000
1891.....	33,175,000	75,417,000	108,592,000
1892.....	33,000,000	82,101,000	115,101,000
1893.....	35,955,000	77,576,000	113,531,000
1894.....	39,500,000	64,000,000	103,500,000
1895.....	46,610,000	72,051,000	118,661,000
1896.....	53,088,000	76,069,000	129,157,000
1897.....	57,363,000	69,637,000	127,000,000
1898.....	64,463,000	70,384,000	134,847,000
1899.....	71,053,000	70,807,000	141,860,000
Total	2,305,914,000	1,655,798,000	3,961,712,000

XVII.—PRECIOUS METAL PRODUCT, UNITED STATES AND MEXICO.

WELLS FARGO & Co.,
San Francisco, December 31, 1899.

DEAR SIR: The following is our annual report of precious metals produced in the States and Territories west of the Missouri River (including British Columbia and Yukon territory) during 1899, which shows in the aggregate: Gold, \$90,190,167; silver, \$38,804,498; copper, \$59,244,994; lead, \$15,302,248; total gross result, \$203,541,907. The "commercial" value at which the several metals named herein have been estimated is: Silver, 60 cents per ounce; copper, 16 cents per pound, and lead, \$4.26 per hundredweight.

Allowance must always be made for probable variations from reported figures, by reason of constantly increasing facilities for transporting bullion, ores, and base metals from the mines outside of the express and the difficulty of getting entirely reliable data from private sources. Estimates obtained in this way are liable to be exaggerated and are, to a considerable degree, guesswork; but with some modifications on this account, made herein, the general results reached, while only approximately correct, may be accepted as the closest approximation possible under the circumstances.

States and Territories.	Gold dust and bullion by express.	Gold dust and bullion by other conveyances.	Silver bullion by express.	Ores and base bullion by freight.	Total.
California	\$13,796,498	\$1,595,000	\$315,304	\$3,246,315	\$18,953,117
Nevada	1,391,743	902,600	600,672	14,400	2,909,415
Oregon	800,910	980,000	75,423	3,560	1,859,893
Washington	215,840	145,000	175,200	73,125	609,165
Alaska		4,545,646		195,200	4,740,846
Idaho	2,495,210		4,235,150	6,006,500	12,736,860
Montana	5,167,500		8,725,000	36,802,500	50,695,000
Utah	2,239,532	1,341,875	122,775	9,950,500	13,654,682
Colorado	26,348,050		13,344,596	3,488,267	43,180,913
New Mexico	259,896	414,716	100,262	1,543,084	2,317,958
Arizona	1,874,551	1,090,609	739,113	16,659,148	20,363,421
Dakota	6,750,000		250,720	46,000	7,046,720
Texas	3,100		290,200		293,300
Wyoming	8,950	200,000	23,600	85,126	317,676
British Columbia and Yukon territory	17,622,941		4,210,000	2,030,000	23,862,941
Total	78,974,721	11,215,446	33,208,015	80,143,725	203,541,907

The gross yield for 1899, shown above, segregated, is approximately as follows:

Metal.	Per cent of total.	Total value.
Gold	44 ³¹ / ₁₀₀	\$90,190,167
Silver	19 ⁷ / ₁₀₀	38,804,498
Copper	29 ¹¹ / ₁₀₀	59,244,994
Lead	7 ⁵¹ / ₁₀₀	15,302,248
Total		203,541,907

The year's combined product of the metals herein treated of is the greatest in the history of the countries—United States of America and British Columbia and Yukon territory—that of gold (\$90,190,167) being above any previous record officially reported; and the world's output of gold for 1899 (approximately \$304,000,000) is amazing. Australasia increased \$18,000,000, the British possessions of the Northwest \$5,000,000, and the United States of America \$6,000,000. The rapidly increasing production of South Africa was arrested by the Boer war about the 1st of October; to that time it showed an increase over corresponding months of last year of \$14,000,000.

ANNUAL PRODUCTS OF LEAD, COPPER, SILVER, AND GOLD IN THE STATES AND TERRITORIES WEST OF THE MISSOURI RIVER, INCLUDING BRITISH COLUMBIA AND YUKON TERRITORY, 1870-1899.

Year.	Product as per W. F. & Co. statements, in- cluding amounts from British Columbia and Yukon territory.	Product after deducting amounts from British Co- lumbia and Yukon terri- tory.
1870	\$54,000,000	\$52,150,000
1871	58,284,000	55,784,000
1872	62,236,959	60,351,824
1873	72,258,693	70,139,860
1874	74,401,045	71,965,610
1875	80,889,057	76,703,433
1876	90,875,173	87,219,859
1877	98,421,754	95,811,582
1878	81,154,622	78,276,167
1879	75,349,501	72,688,888
1880	80,167,936	77,232,512
1881	84,504,417	81,198,474
1882	92,411,835	89,207,549
1883	90,313,612	84,639,212
1884	84,975,954	81,633,835
1885	90,181,260	87,311,382
1886	103,011,761	100,160,222
1887	104,645,959	103,327,770
1888	114,341,592	112,665,569
1889	127,677,836	126,723,384
1890	127,166,410	126,804,855
1891	118,237,441	117,946,565
1892	111,531,700	111,259,508
1893	104,081,591	103,827,623
1894	105,113,489	104,844,112
1895	118,164,642	117,896,988
1896	126,289,536	121,949,536
1897	153,435,469	142,853,469
1898	177,022,666	159,359,466
1899	203,541,907	179,678,966

The net products of the States and Territories west of the Missouri River, exclusive of British Columbia and Yukon territory, divided, are as follows:

Year.	Lead.	Copper.	Silver.	Gold.
1870	\$1,080,000		\$17,320,000	\$33,750,000
1871	2,100,000		19,286,000	34,398,000
1872	2,250,000		19,924,429	38,177,395
1873	3,450,000		27,483,302	39,206,558
1874	3,800,000		29,699,122	38,466,488
1875	5,100,000		31,635,239	39,968,194
1876	5,040,000		39,292,924	42,886,935
1877	5,085,250		45,846,109	44,880,223
1878	3,452,000		37,248,137	37,576,030
1879	4,185,769		37,032,857	31,470,262
1880	5,742,390	\$898,000	38,033,055	32,559,067
1881	6,361,902	1,195,000	42,987,613	30,653,959
1882	8,008,155	4,055,037	48,133,039	29,011,318
1883	8,163,550	5,683,921	42,975,101	27,816,640
1884	6,834,091	6,086,252	43,529,925	25,183,567
1885	8,562,991	7,838,036	41,516,599	26,393,756
1886	9,185,192	9,276,755	52,136,851	29,561,424
1887	9,631,073	10,362,746	50,833,884	32,500,067
1888	11,263,630	18,261,490	53,152,747	29,987,702
1889	14,593,323	14,793,763	64,808,637	32,527,661
1890	11,509,571	20,569,092	62,930,831	31,795,361
1891	12,385,780	13,261,663	60,614,004	31,685,118
1892	11,433,947	19,370,516	50,607,601	29,847,444
1893	7,756,040	23,631,339	38,491,521	33,948,723
1894	8,223,513	22,276,294	28,721,014	45,623,291
1895	7,170,367	27,052,115	35,271,777	48,399,729
1896	6,536,026	28,713,305	33,684,963	53,015,242
1897	8,775,144	36,388,694	34,034,034	63,655,597
1898	11,894,251	45,897,648	35,081,365	66,486,202
1899	13,667,248	58,849,994	34,594,498	72,567,226

The exports of silver during the past year to Japan, China, the Straits, etc., have been as follows: From London, \$33,923,252; from San Francisco, \$5,963,543; total, \$39,886,795, as against \$32,622,032 last year. Pounds sterling estimated at \$4.8665.

STATEMENT OF THE PRODUCT OF GOLD AND SILVER IN THE REPUBLIC OF MEXICO,
REVISED AND CORRECTED, FROM 1877 TO 1899—VALUES UPON MINTAGE BASIS.

Years.	Gold.	Silver.	Total.
1877-1878.....	\$747,000	\$21,837,000	\$25,584,000
1878-1879.....	881,000	25,125,000	26,006,000
1879-1880.....	942,000	26,800,000	27,742,000
1880-1881.....	1,013,000	29,234,000	30,247,000
1881-1882.....	937,000	29,329,000	30,266,000
1882-1883.....	956,000	29,569,000	30,525,000
1883-1884.....	1,055,000	31,695,000	32,750,000
1884-1885.....	914,000	33,226,000	34,140,000
1885-1886.....	1,026,000	34,112,000	35,138,000
1886-1887.....	1,047,000	34,600,000	35,647,000
1887-1888.....	1,031,000	34,912,000	35,943,000
1888-1889.....	1,040,000	40,706,000	41,746,000
1889-1890.....	1,100,000	41,500,000	42,600,000
1890-1891.....	1,150,000	43,000,000	44,150,000
1891-1892.....	1,275,000	45,750,000	47,025,000
1892-1893.....	1,400,000	48,500,000	49,900,000
1893-1894.....	1,425,000	47,250,000	48,675,000
1894-1895.....	4,750,000	54,225,000	58,975,000
1895-1896.....	5,475,000	54,450,000	59,925,000
1896-1897.....	8,500,000	60,683,000	69,183,000
1897-1898.....	9,925,000	67,525,000	77,450,000
1898-1899.....	10,112,000	65,310,000	75,422,000
Total	56,701,000	902,338,000	959,039,000

EXHIBIT OF COINAGE OF GOLD, SILVER, AND COPPER IN THE REPUBLIC OF MEXICO
FROM THE 1ST OF JULY, 1873, TO THE 30TH OF JUNE, 1899.

Years.	Gold dollars.	Silver dol- lars.	Copper dol- lars.
1873-1874.....	866,743	18,846,067	15,966
1874-1875.....	862,619	19,386,958	21,712
1875-1876.....	809,401	19,454,054	30,654
1876-1877.....	695,750	21,415,128	9,035
1877-1878.....	691,998	22,084,203	41,364
1878-1879.....	658,206	22,162,987	16,300
1879-1880.....	521,826	24,018,528	14,035
1880-1881.....	492,068	24,617,395	42,258
1881-1882.....	452,590	25,146,260	11,972
1882-1883.....	407,600	24,083,921	.....
1883-1884.....	328,698	25,377,379	.....
1884-1885.....	423,250	25,840,728	.....
1885-1886.....	425,000	25,850,000	.....
1886-1887.....	410,000	25,600,000	.....
1887-1888.....	340,320	26,711,000	.....
1888-1889.....	305,100	25,274,500	.....
1889-1890.....	243,298	24,328,326	.....
1890-1891.....	308,000	24,238,000	.....
1891-1892.....	291,940	25,527,000	.....
1892-1893.....	361,672	27,169,876	.....
1893-1894.....	553,978	30,185,611	.....
1894-1895.....	545,237	27,628,981	.....
1895-1896.....	565,786	22,634,788	.....
1896-1897.....	453,474	19,296,009	.....
1897-1898.....	459,219	21,427,057	.....
1898-1899.....	715,882	20,184,117	.....
Total	13,189,655	618,488,873	203,296

SUMMARY.—Totals: Gold, \$13,189,655; silver, \$618,488,873; copper, \$203,296.
Grand total, \$631,881,824.

EXHIBIT OF THE COINAGE OF MEXICO FROM THE ESTABLISHMENT OF THE MINTS IN 1537 TO THE END OF THE FISCAL YEAR OF 1899.

	Gold.	Silver.	Copper.	Total.
COLONIAL EPOCH.				
Unmilled coin from 1537 to 1731	\$8,497,950	\$752,067,456	\$200,000	\$760,765,406
Pillar coin, 1732 to 1771	19,889,014	441,629,211	.....	461,518,225
Bust coin, 1772 to 1821	40,391,447	888,563,989	342,893	929,298,329
INDEPENDENCE.				
	68,778,411	2,082,260,656	542,893	2,151,581,960
Iturbide's imperial bust, from 1822 to 1823	557,392	18,575,569	.....	19,132,961
Republic eagle, 1824 to 30th June, 1873	45,040,628	740,246,485	5,235,177	790,522,290
REPUBLIC.				
	45,598,020	758,822,054	5,235,177	809,655,251
Eagle coin, 1st July, 1873, to 30th of June, 1899 ..	13,189,655	618,488,873	203,296	631,881,824

SUMMARY.—Colonial epoch, from 1537 to 1821, \$2,151,581,960; independence, from 1822 to 1873, \$809,655,251; Republic, from 1873 to 1899, \$631,881,824; total, \$3,593,119,035.

XVIII.—HIGHEST, LOWEST, AND AVERAGE PRICE OF BAR SILVER IN LONDON, PER OUNCE BRITISH STANDARD (.925), SINCE 1833, AND THE EQUIVALENT IN UNITED STATES GOLD COIN OF AN OUNCE 1,000 FINE, TAKEN AT THE AVERAGE PRICE.

Calendar years.	Highest quotation.	Lowest Quotation.	Average quotation.	Value of a fine ounce at average quotation.	Calendar years.	Highest quotation.	Lowest quotation.	Average quotation.	Value of a fine ounce at average quotation.
	<i>d.</i>	<i>d.</i>	<i>d.</i>	<i>Dollars.</i>		<i>d.</i>	<i>d.</i>	<i>d.</i>	<i>Dollars.</i>
1833.....	59 ⁷ / ₈	58 ⁷ / ₈	59 ³ / ₁₆	1.297	1867.....	61 ¹ / ₄	60 ³ / ₈	60 ⁹ / ₁₆	1.328
1834.....	60 ⁴ / ₈	59 ³ / ₈	59 ¹¹ / ₁₆	1.313	1868.....	61 ¹ / ₈	60 ¹ / ₈	60 ⁵ / ₈	1.326
1835.....	60	59 ¹ / ₈	59 ¹¹ / ₁₆	1.308	1869.....	61	60	60 ⁷ / ₈	1.325
1836.....	60 ³ / ₈	59 ⁵ / ₈	60	1.315	1870.....	60 ³ / ₈	60 ¹ / ₈	60 ¹ / ₈	1.328
1837.....	60 ³ / ₈	59	59 ⁹ / ₁₆	1.305	1871.....	61	60 ³ / ₈	60 ¹ / ₈	1.326
1838.....	60 ³ / ₈	59 ¹ / ₈	59 ⁷ / ₁₆	1.304	1872.....	61 ¹ / ₈	59 ¹ / ₈	60 ⁵ / ₁₆	1.322
1839.....	60 ⁵ / ₈	60	60 ³ / ₈	1.323	1873.....	59 ¹ / ₁₆	57 ² / ₈	59 ³ / ₁₆	1.29769
1840.....	60 ⁴ / ₈	60 ¹ / ₈	60 ¹ / ₈	1.323	1874.....	59 ¹ / ₈	57 ¹ / ₈	58 ¹ / ₁₆	1.27883
1841.....	60 ³ / ₈	59 ³ / ₈	60 ¹ / ₁₆	1.316	1875.....	57 ⁵ / ₈	55 ¹ / ₈	56 ¹ / ₁₆	1.24233
1842.....	60	59 ¹ / ₄	59 ⁷ / ₁₆	1.303	1876.....	58 ¹ / ₈	46 ³ / ₈	53 ¹ / ₈	1.16114
1843.....	59 ⁵ / ₈	59	59 ³ / ₈	1.297	1877.....	58 ¹ / ₈	53 ¹ / ₈	54 ¹ / ₁₆	1.20189
1844.....	59 ³ / ₈	59 ¹ / ₄	59 ¹ / ₂	1.304	1878.....	55 ¹ / ₄	49 ¹ / ₈	52 ⁵ / ₈	1.15358
1845.....	59 ¹ / ₄	58 ⁷ / ₈	59 ¹ / ₄	1.298	1879.....	53 ³ / ₈	48 ² / ₈	51 ¹ / ₄	1.12392
1846.....	60 ¹ / ₈	59	59 ⁵ / ₁₆	1.300	1880.....	52 ¹ / ₈	51 ¹ / ₈	52 ¹ / ₈	1.14507
1847.....	60 ³ / ₈	58 ⁷ / ₈	59 ¹ / ₁₆	1.308	1881.....	52 ² / ₈	50 ² / ₈	51 ⁵ / ₈	1.13229
1848.....	60	58 ¹ / ₂	59 ¹ / ₂	1.304	1882.....	52 ³ / ₈	50	51 ¹ / ₁₆	1.13562
1849.....	60	59 ¹ / ₂	59 ¹ / ₄	1.309	1883.....	51 ³ / ₈	50 ¹ / ₈	50 ⁹ / ₁₆	1.10871
1850.....	61 ¹ / ₈	59 ¹ / ₂	61 ¹ / ₁₆	1.316	1884.....	51 ³ / ₈	49 ¹ / ₈	50 ¹ / ₁₆	1.11068
1851.....	61	60	61	1.337	1885.....	50	46 ⁷ / ₈	48 ⁹ / ₁₆	1.06510
1852.....	61 ² / ₈	59 ² / ₈	60 ¹ / ₁₆	1.326	1886.....	47	42	45 ³ / ₈	.99467
1853.....	61 ¹ / ₈	60 ⁵ / ₈	61 ¹ / ₂	1.348	1887.....	47 ¹ / ₈	43 ¹ / ₄	44 ¹ / ₁₆	.97946
1854.....	61 ² / ₈	60 ² / ₈	61 ¹ / ₂	1.348	1888.....	44 ⁹ / ₁₆	41 ³ / ₈	42 ⁷ / ₁₆	.93974
1855.....	61	60	61 ⁵ / ₁₆	1.344	1889.....	44 ³ / ₈	41 ⁵ / ₁₆	42 ¹ / ₁₆	.93511
1856.....	62 ¹ / ₈	60 ¹ / ₂	61 ⁵ / ₁₆	1.344	1890.....	54 ⁵ / ₈	43 ³ / ₈	47 ³ / ₄	1.01634
1857.....	62 ³ / ₈	61	61 ³ / ₈	1.353	1891.....	48 ³ / ₈	43 ¹ / ₂	45 ¹ / ₈	.98800
1858.....	61 ¹ / ₂	60 ³ / ₈	61 ⁵ / ₁₆	1.344	1892.....	43 ³ / ₈	37 ² / ₈	39 ³ / ₄	.87145
1859.....	62 ³ / ₈	61 ³ / ₈	62 ¹ / ₁₆	1.360	1893.....	38 ³ / ₈	30 ¹ / ₄	35 ⁹ / ₁₆	.78030
1860.....	62 ³ / ₈	61 ¹ / ₄	61 ¹ / ₁₆	1.352	1894.....	31 ³ / ₈	27	28 ¹ / ₁₆	.63479
1861.....	61 ⁵ / ₈	60 ¹ / ₈	60 ¹ / ₁₆	1.333	1895.....	31 ² / ₈	27 ³ / ₈	29 ¹ / ₁₆	.65406
1862.....	62 ¹ / ₈	61	61 ⁷ / ₁₆	1.346	1896.....	31 ¹ / ₁₆	29 ³ / ₈	30 ¹ / ₁₆	.67565
1863.....	61 ¹ / ₂	61	61 ³ / ₈	1.345	1897.....	29 ¹ / ₂	23 ³ / ₈	27 ¹ / ₁₆	.60438
1864.....	62 ¹ / ₈	60 ³ / ₈	61 ³ / ₈	1.345	1898.....	28 ³ / ₈	25	26 ¹ / ₁₆	.59010
1865.....	61 ⁵ / ₈	60 ⁵ / ₈	61 ¹ / ₁₆	1.338	1899.....	29	26 ⁵ / ₈	27 ¹ / ₁₆	.60154
1866.....	62 ¹ / ₄	60 ³ / ₈	61 ¹ / ₈	1.339					

XIX.—COMMERCIAL RATIO OF SILVER TO GOLD EACH YEAR SINCE 1687.

[NOTE.—From 1687 to 1832 the ratios are taken from Dr. A. Soetbeer; from 1833 to 1878 from Pixley and Abell's tables; and from 1879 to 1896 from daily cablegrams from London to the Bureau of the Mint.]

Years.	Ratio.	Years.	Ratio.	Years.	Ratio.	Years.	Ratio.	Years.	Ratio.	Years.	Ratio.
1687....	14.94	1723....	15.20	1759....	14.15	1795....	15.55	1831....	15.72	1867....	15.57
1688....	14.94	1724....	15.11	1760....	14.14	1796....	15.65	1832....	15.73	1868....	15.59
1689....	15.02	1725....	15.11	1761....	14.54	1797....	15.41	1833....	15.93	1869....	15.60
1690....	15.02	1726....	15.15	1762....	15.27	1798....	15.59	1834....	15.73	1870....	15.57
1691....	14.98	1727....	15.24	1763....	14.99	1799....	15.74	1835....	15.80	1871....	15.57
1692....	14.92	1728....	15.11	1764....	14.70	1800....	15.68	1836....	15.72	1872....	15.63
1693....	14.83	1729....	14.92	1765....	14.83	1801....	15.46	1837....	15.83	1873....	15.93
1694....	14.87	1730....	14.81	1766....	14.80	1802....	15.26	1838....	15.85	1874....	16.16
1695....	15.02	1731....	14.94	1767....	14.85	1803....	15.41	1839....	15.62	1875....	16.64
1696....	15.00	1732....	15.09	1768....	14.80	1804....	15.41	1840....	15.62	1876....	17.75
1697....	15.20	1733....	15.18	1769....	14.72	1805....	15.79	1841....	15.70	1877....	17.20
1698....	15.07	1734....	15.39	1770....	14.62	1806....	15.52	1842....	15.87	1878....	17.92
1699....	14.94	1735....	15.41	1771....	14.66	1807....	15.43	1843....	15.93	1879....	18.39
1700....	14.81	1736....	15.18	1772....	14.52	1808....	16.08	1844....	15.85	1880....	18.05
1701....	15.07	1737....	15.02	1773....	14.62	1809....	15.96	1845....	15.92	1881....	18.25
1702....	15.52	1738....	14.91	1774....	14.62	1810....	15.77	1846....	15.90	1882....	18.20
1703....	15.17	1739....	14.91	1775....	14.72	1811....	15.53	1847....	15.80	1883....	18.64
1704....	15.22	1740....	14.91	1776....	14.55	1812....	16.11	1848....	15.85	1884....	18.61
1705....	15.11	1741....	14.92	1777....	14.54	1813....	16.25	1849....	15.78	1885....	19.41
1706....	15.27	1742....	14.85	1778....	14.68	1814....	15.04	1850....	15.70	1886....	20.78
1707....	15.44	1743....	14.85	1779....	14.80	1815....	15.26	1851....	15.46	1887....	21.10
1708....	15.41	1744....	14.87	1780....	14.72	1816....	15.28	1852....	15.59	1888....	22.00
1709....	15.31	1745....	14.98	1781....	14.78	1817....	15.11	1853....	15.33	1889....	22.10
1810....	15.22	1746....	15.13	1782....	14.42	1818....	15.35	1854....	15.33	1890....	19.75
1711....	15.29	1747....	15.26	1783....	14.48	1819....	15.33	1855....	15.38	1891....	20.92
1712....	15.31	1748....	15.11	1784....	14.70	1820....	15.62	1856....	15.38	1892....	23.72
1713....	15.24	1749....	14.80	1785....	14.92	1821....	15.95	1857....	15.27	1893....	26.49
1714....	15.13	1750....	14.55	1786....	14.96	1822....	15.80	1858....	15.38	1894....	32.56
1715....	15.11	1751....	14.39	1787....	14.92	1823....	15.84	1859....	15.19	1895....	31.60
1716....	15.09	1752....	14.54	1788....	14.65	1824....	15.82	1860....	15.29	1896....	30.59
1717....	15.13	1753....	14.54	1789....	14.75	1825....	15.70	1861....	15.50	1897....	34.20
1718....	15.11	1754....	14.48	1790....	15.04	1826....	15.76	1862....	15.35	1898....	35.03
1719....	15.09	1755....	14.68	1791....	15.05	1827....	15.74	1863....	15.37	1899....	34.36
1720....	15.04	1756....	14.94	1792....	15.17	1828....	15.78	1864....	15.37		
1721....	15.05	1757....	14.87	1793....	15.00	1829....	15.78	1865....	15.44		
1722....	15.17	1758....	14.85	1794....	15.37	1830....	15.82	1866....	15.43		

XX.—IMPORTS OF GOLD AND SILVER, BY

[Compiled by the

Districts.	GOLD.				Total gold.
	Gold contained in ore.	Bullion.	Coin.		
			United States.	Foreign.	
Bangor, Me		\$250, 502	\$1, 663	\$520	\$252, 685
Boston and Charlestown, Mass.		114, 905	5, 840	24, 332	145, 077
Newark, N. J.	\$160, 789				160, 789
New York, N. Y.	1, 591, 177	6, 106, 250	1, 146, 525	5, 914, 712	14, 758, 664
Perth Amboy, N. J.	68, 097				68, 097
Philadelphia, Pa.			147	10, 220	10, 367
Brazos de Santiago, Tex.					
Corpus Christi, Tex.	19, 977	742, 014	290, 391	6, 724	1, 059, 106
Mobile, Ala.		2, 465	15, 137	2, 354	19, 953
New Orleans, La.		320, 300	35, 394		355, 694
Paso del Norte, Tex.	197, 392	7, 393			204, 785
Saluria, Tex.		57, 353			57, 353
Alaska.	5, 770, 287	491, 966			6, 262, 253
Arizona.	255, 348	1, 262, 959			1, 518, 307
Puget Sound, Wash.	1, 937, 288	1, 779, 180	30, 520		3, 746, 988
San Diego, Cal.	11, 031	71, 830			82, 861
San Francisco, Cal.	359, 576	1, 241, 467	507, 459	13, 014, 808	15, 123, 310
Buffalo Creek, N. Y.		44, 009			44, 009
Champlain, N. Y.			5, 395, 875	671, 207	6, 067, 082
Chicago, Ill.					
Detroit, Mich.		627	1, 032		1, 659
Huron, Mich.					
Minnesota, Minn.	25	27, 968			27, 993
Montana and Idaho.					
Niagara, N. Y.	37, 065	174, 502	179, 870	29, 200	420, 637
North and South Dakota.			1, 000	1, 033	2, 033
Oswegatchie, N. Y.	856, 050	83, 199			939, 249
Vermont, Vt.	263	1, 250	4, 500		6, 013
Omaha, Nebr.					
Total.	11, 264, 365	12, 780, 139	7, 615, 353	19, 675, 107	51, 334, 964

DISTRICTS, DURING THE CALENDAR YEAR 1899.

Bureau of Statistics.]

SILVER.					Total silver.
Silver contained in ore.	Bullion.		Coin.		
			United States.	Foreign.	
	<i>Ounces.</i>				
			\$5,284	\$615	\$5,899
				973	973
\$110,845					110,845
13,926,575	2,068,553	\$1,241,123	93,032	1,171,829	16,432,559
869,169					869,169
			500	10,954	11,454
				43,803	43,803
519,409	235,928	144,211		108,227	771,847
			315	12,664	12,979
			14,540	329,823	344,363
3,329,402	1,468,073	820,027		1,544,788	5,694,217
1,534	681,021	339,227		45,574	386,335
1,095,854	674,599	386,245			1,482,099
996,530			9,138		1,005,668
				948	948
411,405	2,556,134	1,815,821	100,165	588,195	2,915,586
			41,861		41,861
12,944					12,944
	140	90	200		290
	1,122	300			300
57,031			2,537		59,568
173,281	4,275	2,563	38,000		213,844
135,143	41,599	24,960			160,103
50	1,000	500	1,620	190	2 360
263,915					263 915
21,903,087	7,732,444	4,775,067	307,192	3,858,583	30,843,929

XXI.—IMPORTS OF GOLD AND SILVER, BY

[Compiled by the

Countries.	GOLD.				Total gold.
	Gold contained in ore.	Bullion.	Coin.		
			United States.	Foreign.	
Azores and Madeira Islands			\$33,038		\$33,038
France.....	\$8,982	\$14,033		\$3,793,717	3,816,732
Germany	7,535	190,447		5,950	203,932
Italy	4,614		40		4,654
United Kingdom	581,369	5,420,979	500	370,339	6,373,187
Bermuda			445		445
British Honduras.....		3,677	29,909	1,681	35,267
Dominion of Canada:					
Nova Scotia, New Brunswick, etc ...	595	365,407	7,535	615	374,152
Quebee, Ontario, etc.....	2,313,275	330,928	5,582,245	701,440	8,927,888
British Columbia	6,442,725	2,566,519	30,585		9,039,829
Newfoundland and Labrador			900	157	1,057
Central American States:					
Costa Rica		92,913			92,913
Guatemala.....			116,915	6,871	123,786
Honduras	13,272	122,023	6,658	2,344	144,297
Nicaragua		350,314	23,295	4,775	378,384
Salvador.....		2,046	8,425	680	11,151
Mexico	1,708,239	2,683,650	324,224	12,285	4,728,398
West Indies:					
British.....		14,586	18,165	14,284	47,035
Cuba.....		3,203	682,801	1,594,067	2,280,071
Danish.....			16,059	92	16,151
Duteh.....		2,168	40,389	10,631	53,188
Freneh.....		1,213	1,978	793	3,984
Haiti.....		2,725	267,634	3,523	273,882
Porto Rico		1,029	8,126	8,584	17,739
Santo Domingo		2,130	2,960	1,413	6,503
Brazil.....			2,700		2,700
Chile.....		7,000	7,836	98,550	113,386
Colombia		170,849	16,853	6,971	194,673
Ecuador		47,852		200	48,052
Guianas—Dutch		1,303			1,303
Peru	11,284		2,270		13,554
Venezuela		10,195	43,532	29,137	82,864
Aden					
China.....			72,875	155,050	227,925
Hongkong	397				397
Japan.....	13,820		58,660	759,025	831,505
British Australasia	158,258	372,950		12,081,153	12,612,361
Hawaiian Islands.....			207,416	9,890	217,306
Philippine Islands.....					
Tonga, Samoa, etc.....			385	890	1,275
Total.....	11,264,365	12,780,139	7,615,353	19,675,107	51,334,964

COUNTRIES, DURING THE CALENDAR YEAR 1899.

Bureau of Statistics.]

SILVER.					
Silver contained in ore.	Bullion.		Coin.		Total silver.
			United States.	Foreign.	
	<i>Ounces.</i>				
			\$59		\$59
\$4,168	10,203	\$6,122	264	\$18	10,572
3,078	3,819	2,291			5,369
1,903				387	2,290
311,149	60,733	36,440		56,456	404,045
			1,509		1,509
			13,869	230,339	244,208
			6,040	650	6,690
83,404	48,136	28,413	84,218	190	196,225
1,611,074			9,138		1,620,212
			450	520	970
	141,667	85,000		15,200	100,200
				73,003	73,003
39,610	686,899	412,139	6,460	60,722	518,931
1,097			600	193,690	195,387
	3,242	1,945		157,650	159,595
19,022,820	6,698,438	4,155,082	564	2,353,424	25,531,890
			7,056	19,990	27,046
	2,903	1,741	52,791	7,717	62,249
			3,713	45	3,758
			861	1,705	2,566
			228	1,118	1,346
	33	20	9,924	439,438	449,382
			6,880	14,341	21,221
			391	39,136	39,527
365,563					365,563
282	73,922	44,353	1,812	166,518	212,965
	495	297	200	2,000	2,497
348,502	720	424			348,926
				32	32
	1,234	800	30,000	24,294	55,094
3					3
			165		165
110,434					110,434
			70,000		70,000
21,903,087	7,732,444	4,775,067	307,192	3,858,583	30,843,929

XXII.—EXPORTS, BY DISTRICTS AND COUNTRIES, OF DOMESTIC GOLD AND

[Compiled by the

	GOLD.			Total gold.
	Gold contained in ore.	Bullion.	Coin.	
DISTRICTS.				
Baltimore, Md.	\$110	\$4,050	\$922	\$5,082
Bangor, Me.		50		50
Boston and Charlestown, Mass.			4,000	4,000
New York, N. Y.	18,815	a 1,502	33,067,011	33,087,328
Galveston, Tex.	2,230			2,230
Alaska.		19,000		19,000
Puget Sound, Wash.			52,442	52,442
San Francisco, Cal.		3,374	2,866,075	2,869,449
Buffalo Creek, N. Y.		202,348		202,348
Champlain N. Y.			4,380,947	4,380,947
Memphremagog, Vt.				
Niagara, N. Y.		53,688	105,697	159,385
Vermont, Vt.	645	248		893
Total	21,800	284,260	40,477,094	40,783,154
COUNTRIES.				
Belgium				
France			7,000,000	7,000,000
Germany	13,050	4,050	3,250,000	3,267,100
Netherlands				
United Kingdom	8,105		20,250,000	20,258,105
British Honduras			15,000	15,000
Dominion of Canada:				
Nova Scotia, New Brunswick, etc.		50		50
Quebec, Ontario, etc.	645	256,284	4,486,644	4,743,573
British Columbia		19,000	52,442	71,442
Central American States:				
Costa Rica			7,929	7,929
Guatemala			1,410	1,410
Salvador			320	320
Mexico		a 1,502	39,585	41,087
Miquelon, Langley, etc.				
West Indies:				
British			122,700	122,700
Cuba			1,223,375	1,223,375
Dutch			2,900	2,900
French			2,354	2,354
Haiti			402,045	402,045
Porto Rico			64,000	64,000
Santo Domingo			230,083	230,083
Brazil			600	600
Colombia			40,272	40,272
Guianas—Dutch			3,000	3,000
Venezuela			418,465	418,465
China				
Hongkong		3,374	75,120	78,494
Japan			4,210	4,210
British Australasia			2,500	2,500
Hawaiian Islands			2,778,640	2,778,640
Tonga, Samoa, etc.			3,500	3,500
British Africa				
Total	21,800	284,260	40,477,094	40,783,154

a United States assay office bars.

SILVER FROM THE UNITED STATES DURING THE CALENDAR YEAR 1899.

Bureau of Statistics.]

SILVER.				Total silver.
Silver contained in ore.	Bullion.		Coin.	
	<i>Ounces.</i>			
	1, 175	\$705		\$705
	179	119		119
			\$20, 000	20, 000
\$37, 573	76, 115, 567	45, 731, 382	462, 710	46, 231, 665
1, 922				1, 922
			29, 049	29, 049
	6, 666, 346	3, 936, 547	159, 360	4, 095, 907
	84, 066	50, 668	2, 198	52, 866
			14, 010	14, 010
			400	400
	102, 095	59, 555	3, 000	62, 555
	10, 058	6, 106	200	6, 306
39, 495	82, 979, 486	49, 785, 082	690, 927	50, 515, 504
1, 882				1, 882
	3, 751, 576	2, 256, 595		2, 256, 595
720	1, 175	705	2, 300	3, 725
40				40
36, 853	72, 359, 959	43, 472, 156		43, 509, 009
	179	119		119
	196, 219	116, 329	19, 808	136, 137
			29, 049	29, 049
			50	50
	9, 931	5, 945		5, 945
			20, 000	20, 000
			7, 382	7, 382
			363, 208	363, 208
			100	100
			52, 300	52, 300
			37, 370	37, 370
	952	578		578
	2, 011, 299	1, 144, 102		1, 144, 102
	4, 645, 116	2, 786, 500		2, 786, 500
			159, 360	159, 360
	3, 080	2, 053		2, 053
39, 495	82, 979, 486	49, 785, 082	690, 927	50, 515, 504

XXIII.—EXPORTS, BY DISTRICTS AND COUNTRIES, OF FOREIGN GOLD AND

[Compiled by the

	GOLD.			Total gold.
	Gold con- tained in ore.	Bullion.	Coin.	
DISTRICTS.				
Baltimore, Md.....				
Bangor, Me.....	\$150			\$150
Boston and Charlestown, Mass.....			\$6,288	6,288
New York, N. Y.....			4,455,397	4,455,397
Corpus Christi, Tex.....				
New Orleans, La.....				
Saluria, Tex.....				
Alaska.....	40,000			40,000
San Francisco, Cal.....				
Champlain, N. Y.....			49,046	49,046
Detroit, Mich.....			20,000	20,000
Vermont, Vt.....		\$376	25,000	25,376
Total.....	40,150	376	4,555,731	4,596,257
COUNTRIES.				
France.....			397,580	397,580
Germany.....				
United Kingdom.....				
Bermuda.....			97,550	97,550
British Honduras.....				
Dominion of Canada:				
Nova Scotia, New Brunswick, etc.....	150			150
Quebec, Ontario, etc.....		376	94,046	94,422
British Columbia.....	40,000			40,000
Central American States:				
Honduras.....				
Salvador.....				
Mexico.....				
West Indies:				
British.....				
Cuba.....			3,939,263	3,939,263
Haiti.....				
Santo Domingo.....			16,759	16,759
Brazil.....				
Colombia.....				
Guianas—British.....				
Venezuela.....			10,533	10,533
Hongkong.....				
British Australasia.....				
Total.....	40,150	376	4,555,731	4,596,257

SILVER FROM THE UNITED STATES DURING THE CALENDAR YEAR 1899.

Bureau of Statistics.]

SILVER.				Total silver.
Silver contained in ore.	Bullion.		Coin.	
	<i>Ounces.</i>			
			\$23	\$23
			319	319
			954,865	954,865
			4,000	4,000
			5,352	5,352
			1,800	1,800
			1,873,581	1,873,581
			43,737	43,737
			41,287	41,287
	100	\$62	21,207	21,269
	100	62	2,946,171	2,946,233
			7,260	7,260
			497,900	497,900
			248	248
			319	319
	100	62	106,231	106,293
			67,590	67,590
			33,103	33,103
			45,200	45,200
			27,782	27,782
			8,295	8,295
			216,875	216,875
			89,264	89,264
			3,373	3,373
			695	695
			1,841,036	1,841,036
			1,000	1,000
	100	62	2,946,171	2,946,233

XXIV.—RECAPITULATION OF IMPORTS AND EXPORTS OF BULLION AND COIN DURING THE CALENDAR YEAR ENDED DECEMBER 31, 1899.

Description.	Imports.	Exports.	Excess.	
			Imports.	Exports.
GOLD.				
Contained in—				
Ore:				
Domestic.....		\$21,800		\$21,800
Foreign.....	\$11,264,365	40,150	\$11,224,215	
Bullion:				
Domestic.....		284,260		284,260
Foreign.....	12,780,139	376	12,779,763	
Coin:				
Domestic.....	7,615,353	40,477,094		32,861,741
Foreign.....	19,675,107	4,555,731	15,119,376	
Total.....	51,334,964	45,379,411	39,123,354	33,167,801
Excess of imports.....			5,955,553	
SILVER.				
Contained in—				
Ore:				
Domestic.....		39,495		39,495
Foreign.....	21,903,087		21,903,087	
Bullion:				
Domestic.....		49,785,082		49,785,082
Foreign.....	4,775,067	62	4,775,005	
Coin:				
Domestic.....	307,192	690,927		383,735
Foreign.....	3,858,583	2,946,171	912,412	
Total.....	30,843,929	53,461,737	27,590,504	50,208,312
Excess of export.....				22,617,808

XXV.—COINAGE OF NATIONS.

Countries.	1897.		1898.		1899.	
	Gold.	Silver.	Gold.	Silver.	Gold.	Silver.
United States	\$76,028,485	\$18,487,297	\$77,985,758	\$23,034,033	\$111,344,220	\$26,061,520
Mexico	417,176	19,608,459	599,442	22,066,445	676,063	18,749,740
Great Britain	8,654,764	4,583,688	28,204,336	6,200,237	43,852,085	7,910,885
Australasia	37,289,873		39,453,387		46,926,487	
India <i>a</i>		25,227,996		26,686,134		<i>b</i> 7,221,063
France	42,726,251	8,492	34,224,022	7,720,000	10,419,111	5,211,000
Germany	30,145,656		42,675,087	3,704,600	33,628,453	4,346,302
Russia <i>c</i>	170,618,508	35,393,252	135,788,949	21,373,189	194,481,077	20,967,769
Austria-Hungary <i>d</i>	33,610,553	5,722,330	14,367,363	1,369,352	4,992,663	3,176,050
Lichtenstein			112		9,178	15,322
Spain	2,890,407	6,724,106			4,863,650	14,884,262
Italy	147,965	307,957		528,650		485,950
San Marino		28,950		7,720		28,950
Servia		1,014,624		143,399		
Japan	31,600,410	4,266,028	16,002,641	8,159,857	8,705,377	4,363,709
Portugal		864,000		1,100,844		2,754,000
Netherlands		964,800	437,259	562,800	724,452	265,320
Norway		147,400		147,400		160,800
Sweden		535,319	1,680,022	795,072	1,537,641	248,910
Denmark		135,513	267,046	53,800		136,548
Belgium				96,500		96,500
Switzerland	1,544,000		1,544,000	424,600	1,158,000	115,800
Turkey	920,962	440,435	1,388,586	442,721	279,871	248,330
Arabia				1,022		1,022
Egypt		519,830		856,114		
Abyssinia		720,133		401,440		201,724
Persia			85,200	5,964,000		
Hongkong		23,836,427		3,150,000		34,596,185
China		10,636,955				
Indo-China		2,773,428		4,589,800		5,733,397
Tunis	632,500	347	579,232	347	579,232	347
Canada		65,964		217,000		398,895
Newfoundland				39,804		100,000
Costa Rica	465,433				698,023	10,000
Brazil					105,673	
Bolivia		1,189,282		1,348,094		1,941,532
Peru		449,807	195,161	120,000	164,658	165,000
Colombia		552,480				
Ecuador		623,687			964,700	50,000
Chile	49					
British Honduras		20,000				
Santo Domingo		606,071		1,415,102		240,395
German East Africa		127,440		174,900		73,567
Straits Settlements		134,000		452,000		636,000
Morocco		873,509		606,918		443,120
Mauritius		50,000				9,730
Ceylon		150,000				97,320
Siam			302	5,329,042		4,080,000
Total	437,722,992	167,790,006	395,477,905	149,282,936	466,110,614	166,226,964

a Rupee calculated at coining rate, \$0.4737.*b* Fiscal year 1899-1900. Rupee calculated at \$0.3244.*c* Ruble calculated at coining rate, \$0.5145.*d* Florin calculated at coining rate, \$0.4052.

WORLD'S PRODUCTION OF GOLD AND SILVER FOR CALENDAR YEARS 1897, 1898, AND 1899.

[Kilogram of gold, \$664.60; kilogram of silver, \$41.56, coinage rate in United States silver dollars.
Fine ounces of gold, \$20.671834+; fine ounces of silver, \$1.292929+, coinage rate in United States silver dollars.]

1897.

Countries.	GOLD.			SILVER.			
	Kilo-grams (fine).	Ounces (fine).	Value.	Kilo-grams (fine).	Ounces (fine).	Coining value.	Commer- cial value.
North America:							
United States.....	86,312	2,774,935	\$57,363,000	1,675,582	53,860,000	\$69,637,200	\$32,316,000
Mexico.....	11,285	362,812	a7,500,000	1,676,925	53,903,180	69,693,000	32,341,900
Canada and New- foundland.....	9,163	294,582	6,089,500	172,923	5,558,446	7,186,700	3,335,100
Africa.....	88,111	2,832,776	58,558,700				
Australasia.....	79,244	2,547,704	52,665,700	369,523	11,878,000	15,357,400	7,126,800
Europe:							
Russia.....	34,977	1,124,511	23,245,700	8,856	284,625	368,000	170,800
Austria-Hungary..	3,364	108,147	2,235,600	61,297	1,970,332	2,547,500	1,182,200
Germany.....	2,066	b66,424	1,373,100	171,047	5,498,135	7,108,700	3,298,900
Norway.....				6,444	207,126	267,800	124,300
Sweden.....	127	4,083	84,400	645	20,728	26,800	12,400
Italy.....	292	9,404	194,400	22,933	737,163	953,100	442,300
Spain.....				71,168	2,288,104	2,958,400	1,372,900
Portugal.....	16	501	10,400	73	2,349	3,000	1,400
Greece.....				37,431	1,203,184	1,555,600	721,900
Turkey.....	21	687	14,200	4,422	142,157	183,800	85,300
Serbia.....	20	c643	13,300	570	e18,322	23,700	11,000
France.....				16,890	542,913	701,900	325,700
Great Britain.....	53	1,698	35,100	7,221	232,108	300,100	139,300
South America:							
Argentina.....	207	6,661	137,700	11,930	383,479	495,800	230,100
Bolivia.....	517	16,617	a343,500	255,244	8,204,568	a10,607,900	4,922,700
Chile.....	513	16,482	a340,700	80,637	2,591,998	a3,351,300	1,555,200
Colombia.....	3,351	107,740	2,227,200	157,022	5,047,328	6,525,800	3,028,400
Ecuador.....	200	c6,429	132,900	240	7,734	a10,000	4,600
Brazil.....	1,812	58,251	1,204,200				
Venezuela.....	1,591	51,151	1,057,400				
Guiana (British) ..	3,140	100,945	2,086,700				
Guiana (Dutch).....	906	29,127	602,100				
Guiana (French)...	2,311	74,299	1,535,900				
Peru.....	945	30,380	628,000	101,997	3,278,602	4,239,000	1,967,200
Uruguay.....	60	1,925	39,800				
Central America.....	701	22,535	a465,800	25,258	811,892	a1,049,700	487,100
Asia:							
Japan.....	1,038	33,385	690,100	54,388	1,748,609	2,260,800	1,049,200
China.....	9,221	296,463	6,128,400				
Korea.....	1,535	49,350	1,020,200				
India (British)....	10,905	350,585	7,247,200				
East Indies (Brit- ish).....	1,033	33,206	686,400				
East Indies(Dutch)	175	5,630	116,400				
Total.....	355,212	11,420,068	236,073,700	4,990,666	160,421,082	207,413,000	96,252,700

a Estimate, Bureau of the Mint.

b Gold separated from silver whose contents do not figure in the statistics of any other country.

c Official figures for 1896.

d Official figures for 1893.

WORLD'S PRODUCTION OF GOLD AND SILVER FOR CALENDAR YEARS 1897, 1898, AND 1899—Continued.

[Kilogram of gold, \$664.60; kilogram of silver, \$41.56, coining rate in United States silver dollars. Fine ounce of gold, \$20.671834+; fine ounce of silver, \$1.292929+, coining rate in United States silver dollars.]

1898.

Countries.	GOLD.			SILVER.			
	Kilo-grams (fine).	Ounces (fine).	Value.	Kilo-grams (fine).	Ounces (fine).	Coining value.	Commer- cial value.
North America:							
United States.....	96,995	3,118,398	\$64,463,000	1,693,563	54,438,000	\$70,384,500	\$32,118,400
Mexico.....	12,790	411,187	a 8,500,000	1,765,116	56,738,000	73,358,200	33,475,400
Canada and New- foundland.....	20,822	b 669,445	13,838,700	138,512	4,452,333	5,756,500	2,626,900
Africa.....	120,566	3,876,216	80,128,500				
Australasia.....	97,594	3,137,644	64,860,800	326,379	10,491,100	13,564,300	6,189,700
Europe:							
Russia.....	38,314	1,231,791	25,463,400	8,664	278,492	360,100	164,300
Austria-Hungary..	2,798	89,954	1,859,500	56,443	1,814,294	2,345,700	1,070,400
Germany.....	111	3,561	73,600	173,329	5,571,516	7,203,600	3,287,200
Norway.....				5,392	173,327	224,100	102,300
Sweden.....	126	4,044	83,600	2,033	65,345	84,500	38,600
Italy.....	250	8,027	165,900	25,028	804,512	1,040,200	474,700
Spain.....	3	96	2,000	76,295	2,452,940	3,171,500	1,447,200
Portugal.....	16	c 501	10,400	73	c 2,349	3,000	1,400
Greece.....				41,950	1,348,411	1,743,400	795,600
Turkey.....	21	c 687	14,200	4,422	c 142,157	183,800	83,900
Servia.....	20	d 643	13,300	570	d 18,322	23,700	10,800
France.....				14,340	460,946	596,000	272,000
Great Britain.....	10	321	6,600	6,575	211,347	273,300	124,700
South America:							
Argentina.....	207	6,661	c 137,700	11,930	383,479	495,800	226,300
Bolivia.....	26	851	17,600	498,777	16,032,713	20,729,200	9,459,300
Chile.....	1,344	43,229	893,600	147,916	4,754,636	6,147,400	2,805,200
Colombia.....	3,248	104,425	2,158,700	170,598	5,483,717	7,090,100	3,235,400
Ecuador.....	59	1,911	39,500	240	7,734	e 10,000	4,600
Brazil.....	2,383	76,613	1,583,700				
Venezuela.....	1,639	52,694	1,089,300				
Guiana (British)...	3,082	99,105	2,048,700				
Guiana (Dutch)...	856	27,532	569,100				
Guiana (French)...	2,474	79,547	1,644,400				
Peru.....	945	c 30,380	628,000	146,923	4,722,687	6,106,100	2,786,400
Uruguay.....	52	1,664	34,400				
Central America.....	719	23,113	477,800	22,377	719,307	930,000	424,400
Asia:							
Japan.....	1,190	38,253	790,800	51,638	1,660,200	2,146,500	979,500
China.....	8,114	260,871	5,392,700				
Korea.....	1,758	56,511	1,168,200				
India (British)....	11,709	376,431	7,781,500				
East Indies (Brit- ish).....	797	25,625	529,700				
East Indies (Dutch)	177	5,689	117,600				
Total.....	431,215	13,863,620	286,586,500	5,389,083	173,227,864	223,971,500	102,204,600

a Estimate, Bureau of the Mint.

c Official figures for 1897.

b Newfoundland product for 1897 included.

d Official figures for 1896.

e Official figures for 1893.

WORLD'S PRODUCTION OF GOLD AND SILVER FOR CALENDAR YEARS 1897, 1898, AND 1899—Continued.

[Kilogram of gold, \$664.60; kilogram of silver, \$41.56, coining rate in United States silver dollars. Fine ounces of gold, \$50.671834+; fine ounce of silver, \$1.292929+, coining rate in United States silver dollars.]

1899.

Countries.	GOLD.			SILVER.			
	Kilo-grams (fine).	Ounces (fine).	Value.	Kilo-grams (fine).	Ounces (fine).	Coining value.	Commer- cial value.
North America:							
United States.....	106,911	3,437,210	\$71,053,400	1,703,720	54,764,500	\$70,806,600	\$32,858,700
Mexico.....	12,790	411,187	a 8,500,000	1,730,089	55,612,090	71,902,500	33,367,300
Canada and New- foundland.....	32,086	b 1,031,563	21,324,300	106,136	3,411,644	4,411,000	2,047,000
Africa.....	110,182	3,542,361	73,227,100				
Australasia.....	119,352	3,837,181	79,321,600	394,682	12,686,658	16,403,000	7,612,000
Europe:							
Russia.....	33,354	1,072,333	22,167,100	4,196	134,887	174,400	80,900
Austria-Hungary..	2,925	94,037	1,943,900	58,961	1,895,253	2,450,400	1,137,200
Germany.....	112	3,589	74,200	194,190	6,242,053	8,070,500	3,745,200
Norway.....				5,193	166,908	215,80c	100,100
Sweden.....	106	3,414	70,600	2,290	73,619	95,200	44,200
Italy.....	c 250	8,027	165,900	c 25,028	804,512	1,040,200	482,700
Spain.....	c 3	96	2,000	c 76,295	2,452,940	3,171,500	1,471,890
Portugal.....	7	227	4,700	119	3,790	4,900	2,300
Greece.....				41,950	c 1,348,411	1,743,400	795,600
Turkey.....	21	d 687	14,200	4,422	d 142,157	183,800	85,300
Servia.....	20	e 643	13,300	570	e 18,322	23,700	11,000
France.....				c 14,340	460,946	596,000	276,600
Great Britain.....	88	2,844	58,800	5,804	186,582	241,200	111,900
South America:							
Argentina.....	207	6,661	d 137,700	11,930	383,479	d 495,800	230,100
Bolivia.....	103	3,311	68,500	337,355	10,843,977	14,020,500	6,506,400
Chile.....	1,344	43,229	c 893,600	147,916	4,754,636	c 6,147,400	2,852,800
Colombia.....	2,723	87,535	1,809,500	109,555	3,521,563	4,553,100	2,112,900
Ecuador.....	72	2,317	47,900	240	7,734	d 10,000	4,600
Brazil.....	3,234	103,983	2,149,500				
Venezuela.....	1,639	52,694	c 1,089,300				
Guiana (British) ..	3,070	98,712	2,040,500				
Guiana (Dutch) ..	884	28,423	587,600				
Guiana (French) ..	2,541	81,691	1,688,700				
Peru.....	d 945	30,380	628,000	146,923	4,722,687	c 6,106,100	2,833,600
Uruguay.....	52	e 1,664	34,400				
Central America.....	879	28,263	584,200	28,767	924,695	1,195,600	554,800
Asia:							
Japan.....	c 1,190	38,253	790,800	c 51,638	1,660,200	2,146,500	996,100
China.....	8,387	269,662	5,574,400				
Korea.....	2,195	70,579	1,459,000				
India (British).....	12,816	412,032	8,517,500				
East Indies (Brit- ish).....	640	20,562	425,100				
East Indies (Dutch).....	177	5,689	117,600				
Total.....	461,305	14,831,039	306,584,900	5,202,309	167,224,243	216,209,100	100,321,100

a Estimate, Bureau of the Mint.

b Newfoundland product for 1897 included.

c Figures for 1898 repeated.

d Figures for 1897 repeated.

e Figures for 1896 repeated.

XXVII.—COINAGE OF THE MINTS OF THE UNITED STATES FROM THEIR ORGANIZATION, 1792, TO DECEMBER 31, 1899.

Denomination.	Pieces.	Value.
GOLD.		
Double eagles.....	74,268,769	\$1,485,375,380.00
Eagles.....	31,531,205	315,312,050.00
Half eagles.....	50,765,241	253,826,205.00
Three-dollar pieces (coinage discontinued act of Sept. 26, 1890).....	539,792	1,619,376.00
Quarter eagles.....	11,579,142	28,947,855.00
Dollars (coinage discontinued act of Sept. 26, 1890).....	19,499,337	19,499,337.00
Total gold.....	188,183,486	2,104,580,203.00
SILVER.		
Dollars (coinage discontinued under act of Feb. 12, 1873, and resumed under act of Feb. 28, 1878).....	493,458,941	<i>a</i> 493,458,941.00
Trade dollars.....	35,965,924	35,965,924.00
Half dollars.....	286,426,184	143,213,092.00
Half dollars, Columbian souvenir.....	5,002,105	2,501,052.50
Quarter dollars.....	247,324,989	61,831,247.25
Quarter dollars, Columbian souvenir.....	40,023	10,005.75
Twenty-cent pieces (coinage discontinued act of May 2, 1878).....	1,355,000	271,000.00
Dimes.....	328,668,100	34,866,810.00
Half-dimes (coinage discontinued act of Feb. 12, 1873).....	97,604,388	4,880,219.40
Three-cent pieces (coinage discontinued act of Feb. 12, 1873).....	42,736,240	1,282,087.20
Total silver.....	1,538,581,894	778,280,379.10
MINOR.		
Five-cent pieces, nickel.....	348,887,267	17,444,363.35
Three-cent pieces, nickel (coinage discontinued act of Sept. 26, 1890).....	31,378,316	941,349.48
Two-cent pieces, bronze (coinage discontinued act of Feb. 12, 1873).....	45,601,000	912,020.00
One-cent pieces, copper (coinage discontinued act of Feb. 21, 1857).....	156,288,744	1,562,887.44
One-cent pieces, nickel (coinage discontinued act of Apr. 22, 1864).....	200,772,000	2,007,720.00
One-cent pieces, bronze.....	977,680,195	9,776,801.95
Half-cent pieces, copper (coinage discontinued act of Feb. 21, 1857).....	7,985,222	39,926.11
Total minor.....	1,768,592,744	32,685,068.33
Total coinage.....	3,495,358,124	2,915,545,650.43

<i>a</i> Silver-dollar coinage under act of Apr. 2, 1792.....		\$8,031,238
Bland-Allison Act, Feb. 28, 1878.....	\$378,166,793	
Sherman Act, July 14, 1890, to Oct. 31, 1893.....	\$36,087,285	
From repeal of purchasing clause (Nov. 1, 1893) of Sherman Act to June 12, 1898.....	42,139,872	
Coined under war-revenue bill approved June 13, 1898, to Dec. 31, 1899.....	23,955,281	
	102,182,438	
Act of March 3, 1891, recoinage of trade dollars.....	5,078,472	
		485,427,703
Total.....		493,458,941

XXVIII.—COINAGE OF SILVER DOLLARS, FRACTIONAL AND SUBSIDIARY SILVER, BY ACTS AND DENOMINATIONS, FROM 1792 TO 1899.

Denomination.	1792 to 1853.	1853 to Feb. 12, 1873.	Feb. 12, 1873, to Dec. 31, 1899.	Total silver.
Dollars.....	\$2,506,890.00	\$5,524,348.00	\$485,427,703.00	\$493,458,941.00
Trade dollars.....			35,965,924.00	35,965,924.00
Total dollars.....	2,506,890.00	5,524,348.00	521,393,627.00	529,424,865.00
Half dollars.....	66,280,640.50	32,666,832.50	44,265,619.00	143,213,092.00
Half dollars, Columbian.....			2,501,052.50	2,501,052.50
Quarter dollars.....	3,994,040.50	17,879,790.50	39,957,416.25	61,831,247.25
Quarter dollars, Columbian.....			10,005.75	10,005.75
Twenty-cent pieces.....			271,000.00	271,000.00
Dimes.....	3,890,230.10	4,908,520.00	26,068,059.90	34,866,810.00
Half dimes.....	1,825,126.40	3,055,093.00		4,880,219.40
Three-cent pieces.....	744,927.00	537,160.20		1,282,087.20
Total subsidiary.....	76,734,964.50	59,047,396.20	113,073,153.40	248,855,514.10
Total silver.....	79,241,854.50	64,571,744.20	634,466,780.40	778,280,379.10

Fractional silver coinage, 1792 to 1853.....	\$76,734,964.50
Subsidiary silver coinage, 1853 to February 12, 1873.....	59,047,396.20
Subsidiary silver coinage, February 12, 1873, to December 31, 1899.....	113,073,153.40
Total.....	248,855,514.10

XXIX.—PRODUCTION OF GOLD AND SILVER IN

[From 1493 to 1885 is from a table of averages for certain periods, compiled by Dr. Adolph Soetbeer.]

	Period.	GOLD.			
		Average annual for period.		Total for period.	
		Fine ounces.	Value.	Fine ounces.	Value.
1	1493-1520	186,470	\$3,855,000	5,221,160	\$107,931,000
2	1521-1544	230,194	4,759,000	5,524,656	114,205,000
3	1545-1560	273,596	5,656,000	4,377,544	90,492,000
4	1561-1580	219,906	4,546,000	4,398,120	90,917,000
5	1581-1600	237,267	4,905,000	4,745,340	98,095,000
6	1601-1620	273,918	5,662,000	5,478,360	113,248,000
7	1621-1640	266,845	5,516,000	5,336,900	110,324,000
8	1641-1660	281,955	5,828,000	5,639,110	116,571,000
9	1661-1680	297,709	6,154,000	5,954,180	123,084,000
10	1681-1700	346,095	7,154,000	6,921,895	143,088,000
11	1701-1720	412,163	8,520,000	8,243,260	170,403,000
12	1721-1740	613,422	12,681,000	12,268,440	253,611,000
13	1741-1760	791,211	16,356,000	15,824,230	327,116,000
14	1761-1780	665,666	13,761,000	13,313,315	273,211,000
15	1781-1800	571,948	11,823,000	11,438,970	236,464,000
16	1801-1810	571,563	11,815,000	5,715,627	118,152,000
17	1811-1820	367,957	7,606,000	3,679,568	76,063,000
18	1821-1830	457,044	9,448,000	4,570,444	94,479,000
19	1831-1840	652,291	13,484,000	6,522,913	134,841,000
20	1841-1850	1,760,502	36,393,000	17,605,018	363,928,000
21	1851-1855	6,410,324	132,513,000	32,051,621	662,566,000
22	1856-1860	6,486,262	134,083,000	32,431,312	670,415,000
23	1861-1865	5,949,582	122,989,000	29,747,913	614,944,000
24	1866-1870	6,270,086	129,614,000	31,350,430	648,071,000
25	1871-1875	5,591,014	115,577,000	27,955,068	577,883,000
26	1876-1880	5,543,110	114,586,000	27,715,550	572,931,000
27	1881-1885	4,794,755	99,116,000	23,973,773	495,582,000
28	1886-1890	5,461,282	112,895,000	27,306,411	564,474,000
29	1891-1895	7,882,565	162,947,000	39,412,823	814,736,000
30	1896	9,783,914	202,251,600	9,783,914	202,251,600
31	1897	11,420,068	236,073,700	11,420,068	236,073,700
32	1898	13,863,620	286,586,500	13,863,620	286,586,500
33	1899	14,831,039	306,584,900	14,831,039	306,584,900
Total.....				474,622,592	9,811,321,700

THE WORLD SINCE THE DISCOVERY OF AMERICA.

For the years 1886 to 1898 the production is the annual estimate of the Bureau of the Mint.]

SILVER.				PERCENTAGE OF PRODUCTION.			
Annual average for period.		Total for period.		By weight.		By value.	
Fine ounces.	Coining value.	Fine ounces.	Coining value.	Gold.	Silver.	Gold.	Silver.
1, 511, 050	\$1, 954, 000	42, 309, 400	\$54, 703, 000	11	89	66.4	33.6
2, 899, 930	3, 710, 000	69, 598, 320	89, 986, 000	7.4	92.6	55.9	4.1
10, 017, 940	12, 952, 000	160, 287, 040	207, 240, 000	2.7	97.3	30.4	69.6
9, 628, 925	12, 450, 000	192, 578, 500	248, 990, 000	2.2	97.8	26.7	73.3
13, 467, 635	17, 413, 000	269, 352, 700	348, 254, 000	1.7	98.3	22	78
13, 596, 235	17, 579, 000	271, 924, 700	351, 579, 000	2	98	24.4	75.6
12, 654, 240	16, 361, 000	253, 084, 800	327, 221, 000	2.1	97.9	25.2	74.8
11, 776, 545	15, 226, 000	235, 530, 900	304, 525, 000	2.3	97.7	27.7	72.3
10, 834, 550	14, 008, 000	216, 691, 000	280, 166, 000	2.7	97.3	30.5	69.5
10, 992, 085	14, 212, 000	219, 841, 700	284, 240, 000	3.1	96.9	33.5	66.5
11, 432, 540	14, 781, 000	228, 650, 800	295, 629, 000	3.5	96.5	36.6	63.4
13, 863, 080	17, 924, 000	277, 261, 600	358, 480, 000	4.2	95.8	41.4	58.6
17, 140, 612	22, 162, 000	342, 812, 235	443, 232, 000	4.4	95.6	42.5	57.5
20, 985, 591	27, 133, 000	419, 711, 820	542, 658, 000	3.1	96.9	33.7	66.3
28, 261, 779	36, 540, 000	565, 235, 580	730, 810, 000	2	98	24.4	75.6
28, 746, 922	37, 168, 000	287, 469, 225	371, 677, 000	1.9	98.1	24.1	75.9
17, 385, 755	22, 479, 000	173, 857, 555	224, 780, 000	2.1	97.9	25.3	74.7
14, 807, 004	19, 144, 000	148, 070, 040	191, 444, 000	3	97	33	67
19, 175, 867	24, 793, 000	191, 758, 675	247, 930, 000	3.3	96.7	35.2	64.8
25, 090, 342	32, 440, 000	250, 903, 422	324, 400, 000	6.6	93.4	52.9	47.1
28, 488, 597	36, 824, 000	142, 442, 986	184, 169, 000	18.4	81.6	78.3	21.7
29, 095, 428	37, 618, 000	145, 477, 142	188, 092, 000	18.2	81.8	78.1	21.9
35, 401, 972	45, 772, 000	177, 009, 862	228, 861, 000	14.4	85.6	72.9	27.1
43, 051, 583	55, 663, 000	215, 257, 914	278, 313, 000	12.7	87.3	70	30
63, 317, 014	81, 864, 000	316, 585, 069	409, 322, 000	8.1	91.9	58.5	41.5
78, 775, 602	101, 851, 000	393, 878, 009	509, 256, 000	6.6	93.4	53	47
92, 003, 944	118, 955, 000	460, 019, 722	594, 773, 000	5	95	45.5	54.5
108, 911, 431	140, 815, 000	544, 557, 155	704, 074, 000	4.8	95.2	44.5	55.5
157, 581, 331	203, 742, 000	787, 906, 656	1, 018, 708, 000	4.8	95.2	44.4	55.6
157, 061, 370	203, 069, 200	157, 061, 370	203, 069, 200	5.9	94.1	49.9	50.1
160, 421, 082	207, 413, 000	160, 421, 082	207, 413, 000	6.7	93.3	53.2	46.8
173, 227, 864	223, 971, 500	173, 227, 864	223, 971, 500	7.4	92.6	56.1	43.9
167, 224, 243	216, 209, 100	167, 224, 243	216, 209, 100	8.1	91.9	58.6	41.4
.....	.....	8, 657, 999, 086	11, 194, 174, 800	5.2	94.8	46.7	53.3

XXX.—COINAGE OF THE MINTS OF THE UNITED STATES

[Coinage of the mint at Philadelphia from

Calendar years.	GOLD COINAGE.					
	Double eagles.	Eagles.	Half eagles.	Three dollars.	Quarter eagles.	Dollars.
1793 to 1795		\$27, 950	\$43, 535			
1796		60, 800	16, 995		\$165. 00	
1797		91, 770	32, 030		4, 390. 00	
1798		79, 740	124, 335		1, 535. 00	
1799		174, 830	37, 255		1, 200. 00	
1800		259, 650	58, 110			
1801		292, 540	130, 030			
1802		150, 900	265, 880		6, 530. 00	
1803		89, 790	167, 530		1, 057. 50	
1804		97, 950	152, 375		8, 317. 50	
1805			165, 915		4, 452. 50	
1806			320, 465		4, 040. 00	
1807			420, 465		17, 030. 00	
1808			277, 890		6, 775. 00	
1809			169, 375			
1810			501, 435			
1811			497, 905			
1812			290, 435			
1813			477, 140			
1814			77, 270			
1815			3, 175			
1816						
1817						
1818			242, 940			
1819			258, 615			
1820			1, 319, 030			
1821			173, 205		16, 120. 00	
1822			88, 980			
1823			72, 425			
1824			86, 700		6, 500. 00	
1825			145, 300		11, 085. 00	
1826			90, 345		1, 900. 00	
1827			124, 565		7, 000. 00	
1828			140, 145			
1829			287, 210		8, 507. 50	
1830			631, 755		11, 350. 00	
1831			702, 970		11, 300. 00	
1832			787, 435		11, 000. 00	
1833			968, 150		10, 400. 00	
1834			3, 660, 845		293, 425. 00	
1835			1, 857, 670		328, 505. 00	
1836			2, 765, 735		1, 369, 965. 00	
1837			1, 035, 605		112, 700. 00	
1838		72, 000	1, 432, 940		117, 575. 00	
1839		382, 480	590, 715		67, 552. 50	
1840		473, 380	686, 910		47, 147. 50	
1841		631, 310	79, 165			
1842		815, 070	137, 890		7, 057. 50	
1843		754, 620	3, 056, 025		251, 365. 00	
1844		63, 610	1, 701, 650		16, 960. 00	
1845		261, 530	2, 085, 495		227, 627. 50	
1846		200, 950	1, 979, 710		53, 995. 00	
1847		8, 622, 580	4, 579, 905		74, 535. 00	
1848		1, 454, 840	1, 303, 875		22, 215. 00	
1849		6, 536, 180	665, 350		58, 235. 00	\$688, 567
1850	\$23, 405, 220	2, 914, 510	322, 455		632, 307. 50	481, 953
1851	41, 743, 100	1, 763, 280	1, 887, 525		3, 431, 870. 00	3, 317, 671
1852	41, 060, 520	2, 631, 060	2, 869, 505		2, 899, 202. 50	2, 045, 351
1853	25, 226, 520	2, 012, 530	1, 528, 850		3, 511, 670. 00	4, 076, 051
1854	15, 157, 980	542, 500	803, 375	\$415, 854	1, 490, 645. 00	1, 639, 415
1855	7, 293, 320	1, 217, 010	585, 490	151, 665	588, 700. 00	758, 269
1856	6, 597, 560	604, 900	989, 950	78, 030	960, 600. 00	1, 762, 936
1857	8, 787, 500	166, 060	490, 940	62, 673	535, 325. 00	774, 789
1858	4, 234, 280	25, 210	75, 680	6, 399	118, 442. 50	117, 995
1859	871, 940	160, 930	84, 070	46, 914	98, 610. 00	168, 244
1860	11, 553, 400	117, 830	99, 125	21, 465	56, 687. 50	36, 668
1861	59, 529, 060	1, 132, 330	3, 199, 750	18, 216	3, 181, 295. 00	527, 499
1862	1, 842, 660	109, 950	22, 325	17, 355	280, 882. 50	1, 326, 865
1863	2, 855, 800	12, 480	12, 360	15, 117	75. 00	6, 250
1864	4, 085, 700	35, 800	21, 100	8, 040	7, 185. 00	5, 950
1865	7, 024, 000	40, 050	6, 475	3, 495	3, 862. 50	3, 725
Carried forward	261, 268, 560	35, 080, 900	50, 967, 775	845, 223	20, 996, 875. 00	17, 738, 228

NOTE.—Not susceptible of exact statement by years of actual date of coin, the registry of annual coinage being of coin delivered by coiners of mints within the given year, and these deliveries not having been invariably completed within the year of the date of the coin, as now required.

FROM THEIR ORGANIZATION, BY CALENDAR YEARS.

its organization, 1793, to December 31, 1899.

SILVER COINAGE.							
Trade dollars.	Dollars.	Half dollars.	Quarter dollars.	Twenty cents.	Dimes.	Half dimes.	Three cents.
	\$204,791	\$161,572.00				\$4,320.80	
	72,920		\$1,473.50		\$2,213.50	511.50	
	7,776	1,959.00	63.00		2,526.10	2,226.35	
	327,536				2,755.00		
	423,515						
	220,920				2,176.00	1,200.00	
	54,451	15,144.50			3,464.00	1,695.50	
	41,650	14,945.00			1,097.50	650.50	
	66,064	15,857.50			3,304.00	1,892.50	
	19,570	78,259.50	1,684.50		826.50		
	321	105,861.00	30,348.50		12,078.00	780.00	
		419,788.00	51,531.00				
		525,788.00	55,160.75		16,500.00		
		684,300.00					
		702,905.00			4,471.00		
		638,138.00			635.50		
		601,822.00			6,518.00		
		814,029.50					
		620,951.50					
		519,537.50			42,150.00		
			17,308.00				
		23,575.00	5,000.75				
		607,783.50					
		980,161.00	90,293.50				
		1,104,000.00	36,000.00				
		375,561.00	31,861.00		94,258.70		
		652,898.50	54,212.75		118,651.20		
		779,786.50	16,020.00		10,000.00		
		847,100.00	4,450.00		44,000.00		
		1,752,477.00					
		1,471,583.00	42,000.00		51,000.00		
		2,002,030.00					
		2,746,700.00	1,000.00		121,500.00		
		1,537,600.00	25,500.00		12,500.00		
		1,856,078.00			77,000.00	61,500.00	
		2,382,400.00			51,000.00	62,000.00	
		2,936,830.00	99,500.00		77,135.00	62,135.00	
		2,398,500.00	80,000.00		52,250.00	48,250.00	
		2,603,000.00	39,000.00		48,500.00	68,500.00	
		3,206,002.00	71,500.00		63,500.00	74,000.00	
		2,676,003.00	488,000.00		141,000.00	138,000.00	
	1,000	3,273,100.00	118,000.00		119,000.00	95,000.00	
		1,811,910.00	63,100.00		104,200.00	113,800.00	
		1,773,000.00	208,000.00		199,250.00	112,750.00	
	300	1,667,280.00	122,786.50		105,311.50	53,457.50	
	61,005	717,504.00	47,031.75		135,858.00	67,204.25	
	173,000	155,000.00	30,000.00		162,250.00	57,500.00	
	184,618	1,006,382.00	22,000.00		188,750.00	40,750.00	
	165,100	1,922,000.00	161,400.00		137,000.00	58,250.00	
	20,000	883,000.00	105,300.00		7,250.00	21,500.00	
	21,500	294,500.00	230,500.00		175,500.00	78,200.00	
	110,600	1,105,000.00	127,500.00		3,130.00	1,350.00	
	140,750	578,000.00	183,500.00		24,500.00	63,700.00	
	15,000	290,000.00	36,500.00		45,150.00	33,400.00	
	62,600	626,000.00	85,000.00		83,900.00	65,450.00	
	7,500	113,500.00	47,700.00		193,150.00	47,750.00	
	1,300	100,375.00	40,000.00		102,650.00	39,050.00	\$163,422.00
	1,100	38,565.00	44,265.00		153,550.00	50,025.00	559,905.00
	46,110	1,766,354.00	3,813,555.00		1,217,301.00	667,251.00	342,000.00
	33,140	1,491,000.00	3,095,000.00		447,000.00	287,000.00	20,130.00
	26,000	379,750.00	714,250.00		207,500.00	87,500.00	4,170.00
	63,500	469,000.00	1,816,000.00		578,000.00	244,000.00	43,740.00
	94,000	994,000.00	2,111,000.00		558,000.00	364,000.00	31,260.00
		2,113,000.00	1,842,000.00		154,000.00	175,000.00	48,120.00
	256,500	374,000.00	336,000.00		43,000.00	17,000.00	10,950.00
	218,930	151,850.00	201,350.00		60,700.00	39,950.00	8,610.00
	78,500	1,444,200.00	1,213,650.00		192,400.00	164,050.00	14,910.00
	12,090	126,175.00	233,137.50		84,755.00	74,627.50	10,906.50
	27,660	251,830.00	48,015.00		1,446.00	923.00	613.80
	31,170	189,785.00	23,517.50		3,907.00	23.50	14.10
	47,000	255,950.00	14,825.00		1,050.00	675.00	255.00
	3,342,490	65,225,996.50	18,676,790.50		6,552,468.50	3,648,798.90	1,259,066.40

XXX.—COINAGE OF THE MINTS OF THE UNITED STATES

[Coinage of the mint at Philadelphia from

Calendar years.	GOLD COINAGE.					
	Double eagles.	Eagles.	Half eagles.	Three dollars.	Quarter eagles.	Dollars.
Brought forward	\$261,268,560	\$35,080,900	\$50,967,775	\$845,223	\$20,996,875.00	\$17,738,228
1866.	13,975,500	37,800	33,600	12,090	7,775.00	7,180
1867.	5,021,300	31,400	34,600	7,950	8,125.00	5,250
1868.	1,972,000	106,550	28,625	14,625	9,062.50	10,525
1869.	3,503,100	18,550	8,925	7,575	10,862.50	5,925
1870.	3,103,700	25,350	20,175	10,605	11,387.50	6,335
1871.	1,603,000	17,800	16,150	3,990	13,375.00	3,930
1872.	5,037,600	16,500	8,450	6,090	7,575.00	3,530
1873.	34,196,500	8,250	562,525	75	445,062.50	125,125
1874.	7,336,000	531,600	17,540	125,460	9,850.00	198,820
1875.	5,914,800	1,200	1,100	60	1,050.00	420
1876.	11,678,100	7,320	7,385	135	10,552.50	3,245
1877.	7,953,400	8,170	5,760	4,464	4,130.00	3,920
1878.	10,872,900	738,000	658,700	246,972	715,650.00	3,020
1879.	4,152,600	3,847,700	1,509,750	9,090	222,475.00	3,030
1880.	1,029,120	16,448,760	15,832,180	3,108	7,490.00	1,636
1881.	45,200	38,772,600	28,544,000	1,650	1,700.00	7,660
1882.	12,600	23,244,800	12,572,800	4,620	10,100.00	5,040
1883.	800	2,087,400	1,167,200	2,820	4,900.00	10,840
1884.	1,420	769,050	955,240	3,318	4,982.50	6,206
1885.	16,560	2,535,270	3,007,530	2,730	2,217.50	12,205
1886.	22,120	2,361,600	1,942,160	3,426	10,220.00	6,016
1887.	2,420	536,800	435	18,480	15,705.00	8,543
1888.	4,525,320	1,329,960	91,480	15,873	40,245.00	16,080
1889.	882,220	44,850	37,825	7,287	44,120.00	30,729
1890.	1,519,900	580,430	21,640	-----	22,032.50	-----
1891.	28,840	918,680	307,065	-----	27,600.00	-----
1892.	90,460	7,975,520	3,767,860	-----	6,362.50	-----
1893.	6,886,780	18,408,950	7,640,985	-----	75,265.00	-----
1894.	27,379,800	24,707,780	4,789,775	-----	10,305.00	-----
1895.	22,293,120	5,678,260	6,729,680	-----	15,297.50	-----
1896.	15,853,260	763,480	295,315	-----	48,005.00	-----
1897.	27,665,220	10,001,590	4,339,415	-----	74,760.00	-----
1898.	3,409,400	8,121,970	3,167,475	-----	60,412.50	-----
1899.	33,387,680	12,623,050	8,553,645	-----	68,375.00	-----
Total	522,641,300	218,387,890	157,644,765	1,357,716	23,023,902.50	18,223,438

FROM THEIR ORGANIZATION, BY CALENDAR YEARS—Continued.

its organization, 1793, to December 31, 1899.]

SILVER COINAGE.							
Trade dollars.	Dollars.	Half dollars.	Quarter dollars.	Twenty cents.	Dimes.	Half dimes.	Three cents.
.....	\$3,342,490	\$65,225,996.50	\$18,676,790.50	.....	\$6,552,468.50	\$3,648,798.90	\$1,259,066.40
.....	49,625	372,812.50	4,381.25	.....	872.50	536.25	681.75
.....	60,325	212,162.50	5,156.25	.....	662.50	431.25	138.75
.....	182,700	189,100.00	7,500.00	.....	46,625.00	4,295.00	123.00
.....	424,300	397,950.00	4,150.00	.....	25,660.00	10,430.00	153.00
.....	433,000	300,450.00	21,850.00	.....	47,150.00	26,830.00	120.00
.....	1,115,760	582,680.00	42,808.00	.....	75,361.00	74,443.00	127.80
.....	1,106,450	440,775.00	45,737.50	.....	239,645.00	147,397.50	58.50
\$397,500	293,600	1,308,750.00	371,075.00	.....	394,710.00	35,630.00	18.00
987,800	.....	1,180,150.00	117,975.00	.....	294,070.00	.....	.....
218,900	.....	3,013,750.00	1,073,375.00	\$7,940	1,035,070.00	.....	.....
456,150	.....	4,209,575.00	4,454,287.50	3,180	1,146,115.00	.....	.....
3,039,710	.....	4,152,255.00	2,727,927.50	102	731,051.00	.....	.....
900	10,509,550	689,200.00	565,200.00	120	167,880.00	.....	.....
1,541	14,807,100	2,950.00	3,675.00	.....	1,510.00	.....	.....
1,987	12,601,355	4,877.50	3,738.75	.....	3,735.50	.....	.....
960	9,163,975	5,487.50	3,243.75	.....	2,497.50	.....	.....
1,097	11,101,100	2,750.00	4,075.00	.....	391,110.00	.....	.....
979	12,291,039	4,519.50	3,859.75	.....	767,571.20	.....	.....
.....	14,070,875	2,637.50	2,218.75	.....	336,638.00	.....	.....
.....	17,787,767	3,065.00	3,632.50	.....	253,342.70	.....	.....
.....	19,963,886	2,943.00	1,471.50	.....	637,757.00	.....	.....
.....	20,290,710	2,855.00	2,677.50	.....	1,128,393.90	.....	.....
.....	19,183,833	6,416.50	2,708.25	.....	549,648.70	.....	.....
.....	21,726,811	6,355.50	3,177.75	.....	738,071.10	.....	.....
.....	16,802,590	6,295.00	20,147.50	.....	991,154.10	.....	.....
.....	8,694,206	100,300.00	980,150.00	.....	1,531,060.00	.....	.....
.....	1,037,245	<i>a</i> 942,622.50	2,059,311.25	.....	1,212,124.50	.....	.....
.....	378,792	<i>b</i> 2,939,448.50	<i>c</i> 1,371,203.75	.....	334,079.20	.....	.....
.....	110,972	574,486.00	858,243.00	.....	133,097.20	.....	.....
.....	12,880	917,609.00	1,110,220.00	.....	69,088.00	.....	.....
.....	9,976,762	475,381.00	968,690.50	.....	200,076.20	.....	.....
.....	2,822,731	1,240,365.50	2,035,182.75	.....	1,086,926.40	.....	.....
.....	5,884,735	1,478,367.50	2,775,183.75	.....	1,632,073.50	.....	.....
.....	330,846	2,769,423.00	3,156,211.50	.....	1,958,084.60	.....	.....
5,107,524	236,558,010	93,764,761.50	43,487,236.00	11,342	24,715,379.80	3,948,791.90	1,260,487.20

a Includes Columbian souvenir half dollars, 1892, \$475,000.*b* Includes Columbian souvenir half dollars, 1893, \$2,026,052.50.*c* Includes Columbian souvenir quarter dollars, 1893, \$10,005.75.

XXX.—COINAGE OF THE MINTS OF THE UNITED STATES

[Coinage of the mint at Philadelphia from

Calendar years.	MINOR COINAGE.		
	Five cents.	Three cents.	Two cents.
1793-1795			
1796			
1797			
1798			
1799			
1800			
1801			
1802			
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1859			
1860			
1861			
1862			
1863			
1864			\$396,950.00
1865		\$341,460.00	272,800.00
1866	\$737,125.00	141,030.00	63,540.00
1867	1,545,475.00	117,450.00	58,775.00
1868	1,440,850.00	97,560.00	56,075.00
1869	819,750.00	48,120.00	30,930.00
Carried forward	4,543,200.00	748,620.00	879,070.00

FROM THEIR ORGANIZATION, BY CALENDAR YEARS—Continued.

its organization, 1793, to December 31, 1899.]

MINOR COINAGE.		TOTAL COINAGE.			TOTAL VALUE.
Cents.	Half cents.	Gold.	Silver.	Minor.	
\$10,660.33	\$712.67	\$71,485.00	\$370,683.80	\$11,373.00	\$453,541.80
9,747.00	577.40	77,960.00	77,118.50	10,324.40	165,402.90
8,975.10	535.24	128,190.00	14,550.45	9,510.34	152,250.79
9,797.00	.....	205,610.00	330,291.00	9,797.00	545,698.00
9,045.85	60.83	213,285.00	423,515.00	9,106.68	645,906.68
28,221.75	1,057.65	317,760.00	224,296.00	29,279.40	571,335.40
13,628.37	.....	422,570.00	74,758.00	13,628.37	510,956.37
34,351.00	71.83	423,310.00	58,343.00	34,422.83	516,075.83
24,713.53	489.50	258,377.50	87,118.00	25,203.03	370,698.53
7,568.38	5,276.56	258,642.50	100,340.50	12,844.94	371,827.94
9,411.16	4,072.32	170,367.50	149,388.50	13,483.48	333,239.48
3,480.00	1,780.00	324,505.00	471,319.00	5,260.00	801,084.00
7,272.21	2,380.00	437,495.00	597,448.75	9,652.21	1,044,595.96
11,090.00	2,000.00	284,665.00	684,300.00	13,090.00	982,055.00
2,228.67	5,772.86	169,375.00	707,376.00	8,001.53	884,752.53
14,585.00	1,075.00	501,435.00	638,773.50	15,660.00	1,155,868.50
2,180.25	315.70	497,905.00	608,340.00	2,495.95	1,108,740.95
10,755.00	.....	290,435.00	814,029.50	10,755.00	1,115,219.50
4,180.00	.....	477,140.00	620,951.50	4,180.00	1,102,271.50
3,578.30	.....	77,270.00	561,687.50	3,578.30	642,535.80
.....	.....	3,175.00	17,308.00	.....	20,483.00
28,209.82	.....	.....	28,575.75	28,209.82	56,785.57
39,484.00	.....	.....	607,783.50	39,484.00	647,267.50
31,670.00	.....	242,940.00	1,070,454.50	31,670.00	1,345,064.50
26,710.00	.....	258,615.00	1,140,000.00	26,710.00	1,425,325.00
44,075.50	.....	1,319,030.00	501,680.70	44,075.50	1,864,786.20
3,890.00	.....	189,325.00	825,762.45	3,890.00	1,018,977.45
20,723.39	.....	88,980.00	805,806.50	20,723.39	915,509.89
.....	.....	72,425.00	895,550.00	.....	967,975.00
12,620.00	.....	93,200.00	1,752,477.00	12,620.00	1,858,297.00
14,611.00	315.00	156,385.00	1,564,583.00	14,926.00	1,735,894.00
15,174.25	1,170.00	92,245.00	2,002,090.00	16,344.25	2,110,679.25
23,577.32	.....	131,565.00	2,869,200.00	23,577.32	3,024,342.32
22,606.24	3,030.00	140,145.00	1,575,600.00	25,636.24	1,741,381.24
14,145.00	2,435.00	295,717.50	1,994,578.00	16,580.00	2,306,875.50
17,115.00	.....	643,105.00	2,495,400.00	17,115.00	3,155,620.00
33,592.60	11.00	714,270.00	3,175,600.00	33,603.60	3,923,473.60
23,620.00	.....	798,435.00	2,579,000.00	23,620.00	3,401,055.00
27,390.00	770.00	978,550.00	2,759,000.00	28,160.00	3,765,710.00
18,551.00	600.00	3,954,270.00	3,415,002.00	19,151.00	7,388,423.00
38,784.00	705.00	2,186,175.00	3,443,003.00	39,489.00	5,668,667.00
21,110.00	1,990.00	4,135,700.00	3,606,100.00	23,100.00	7,764,900.00
55,583.00	.....	1,148,305.00	2,096,010.00	55,583.00	3,299,898.00
63,702.00	.....	1,622,515.00	2,293,000.00	63,702.00	3,979,217.00
31,286.61	.....	1,040,747.50	1,949,135.50	31,286.61	3,021,169.61
24,627.00	.....	1,207,437.50	1,028,603.00	24,627.00	2,260,667.50
15,973.67	.....	710,475.00	577,750.00	15,973.67	1,304,198.67
23,833.90	.....	960,017.50	1,442,500.00	23,833.90	2,426,351.40
24,283.20	.....	4,062,010.00	2,443,750.00	24,283.20	6,530,043.20
23,987.52	.....	1,782,220.00	1,037,050.00	23,987.52	2,843,257.52
38,948.04	.....	2,574,652.50	803,200.00	38,948.04	3,416,800.54
41,208.00	.....	2,234,655.00	1,347,580.00	41,208.00	3,623,443.00
61,836.69	.....	13,277,020.00	990,450.00	61,836.69	14,329,306.69
64,157.99	.....	2,780,930.00	420,050.00	64,157.99	3,265,137.99
41,785.00	199.32	7,948,332.00	922,950.00	41,984.32	8,913,266.32
44,268.44	199.06	27,756,445.50	409,600.00	44,467.50	28,210,513.00
98,897.07	738.36	52,143,446.00	446,797.00	99,635.43	52,639,878.43
50,630.94	.....	51,505,638.50	847,410.00	50,630.94	52,403,679.44
66,411.31	648.47	36,355,621.00	7,852,571.00	67,059.78	44,275,251.78
42,361.56	276.79	20,049,799.00	5,373,270.00	42,638.35	25,465,707.35
15,748.29	282.50	10,594,454.00	1,419,170.00	16,030.79	12,029,654.79
26,904.63	202.15	10,993,976.00	3,214,240.00	27,106.78	14,235,322.78
177,834.56	175.90	10,817,287.00	4,452,260.00	178,010.46	15,447,557.46
246,000.00	.....	4,578,006.50	4,332,120.00	246,000.00	9,156,126.50
364,000.00	.....	1,430,708.00	1,037,450.00	364,000.00	2,832,158.00
205,660.00	.....	11,885,175.50	681,390.00	205,660.00	12,772,225.50
101,000.00	.....	67,588,150.00	3,107,740.00	101,000.00	70,796,890.00
280,750.00	.....	3,600,037.50	541,691.50	280,750.00	4,422,479.00
498,400.00	.....	2,902,082.00	330,517.80	498,400.00	3,730,999.80
529,737.14	.....	4,163,775.00	248,417.10	926,687.14	5,338,879.24
354,292.86	.....	7,081,607.50	319,755.00	968,552.86	8,369,915.36
98,265.00	.....	14,073,945.00	428,909.25	1,042,960.00	15,545,814.25
98,210.00	.....	5,108,625.00	278,876.25	1,819,910.00	7,207,411.25
102,665.00	.....	2,141,387.50	430,343.00	1,697,150.00	4,268,880.50
64,200.00	.....	3,554,937.50	862,643.00	963,000.00	5,380,580.50
4,680,577.44	39,926.11	411,776,456.00	100,706,382.30	10,891,393.55	523,374,231.85

XXX.—COINAGE OF THE MINTS OF THE UNITED STATES

[Coinage of the mint at Philadelphia from

Calendar years.	MINOR COINAGE.		
	Five cents.	Three cents.	Two cents.
Brought forward.....	\$4, 543, 200.00	\$748, 620.00	\$879, 070.00
1870	240, 300.00	40, 050.00	17, 225.00
1871	28, 050.00	18, 120.00	14, 425.00
1872	301, 800.00	25, 860.00	1, 300.00
1873	227, 500.00	35, 190.00	.....
1874	176, 900.00	23, 700.00	.....
1875	104, 850.00	6, 840.00	.....
1876	126, 500.00	4, 860.00	.....
1877 .....	.....	.....	.....
1878	117. 50	70. 50	.....
1879	1, 455.00	1, 236.00	.....
1880	997. 75	748. 65	.....
1881	3, 618. 75	32, 417. 25	.....
1882	573, 830.00	759.00	.....
1883	1, 148, 471.05	318. 27	.....
1884	563, 697.10	169. 26	.....
1885	73, 824. 50	143. 70	.....
1886	166, 514. 50	128. 70	.....
1887	763, 182. 60	238. 83	.....
1888	536, 024. 15	1, 232. 49	.....
1889	794, 068.05	646. 83	.....
1890	812, 963. 60	.....	.....
1891	841, 717. 50	.....	.....
1892	584, 982. 10	.....	.....
1893	668, 509. 75	.....	.....
1894	270, 656. 60	.....	.....
1895	498, 994. 20	.....	.....
1896	442, 146. 00	.....	.....
1897	1, 021, 436. 75	.....	.....
1898	626, 604. 35	.....	.....
1899	1, 301, 451. 55	.....	.....
Total	17, 444, 363. 35	941, 349. 48	912, 020. 00

FROM THEIR ORGANIZATION, BY CALENDAR YEARS—Continued.

its organization, 1793, to December 31, 1899.]

MINOR COINAGE.		TOTAL COINAGE.			TOTAL VALUE.
Cents.	Half cents.	Gold.	Silver.	Minor.	
\$4,680,577.44	\$39,926.11	\$411,776,456.00	\$100,706,382.30	\$10,891,393.55	\$523,374,231.85
52,750.00		3,177,552.50	829,400.00	350,325.00	4,357,277.50
39,295.00		1,658,245.00	1,891,179.80	99,890.00	3,649,314.80
40,420.00		5,079,745.00	1,980,063.50	369,380.00	7,429,188.50
116,765.00		35,337,537.50	2,801,283.00	379,455.00	38,518,275.50
141,875.00		8,219,270.00	2,579,995.00	342,475.00	11,141,740.00
135,280.00		5,918,630.00	5,349,035.00	246,970.00	11,514,635.00
79,440.00		11,706,737.50	10,269,307.50	210,800.00	22,186,845.00
8,525.00		7,979,844.00	10,651,045.50	8,525.00	18,639,414.50
57,998.50		13,235,242.00	11,932,850.00	58,186.50	25,226,278.50
162,312.00		9,744,645.00	14,816,776.00	165,003.00	24,726,424.00
389,649.55		33,322,294.00	12,615,693.75	391,395.95	46,329,383.70
392,115.75		67,372,810.00	9,176,163.75	428,151.75	76,977,125.50
385,811.00		35,849,960.00	11,500,132.00	969,400.00	48,310,492.00
455,981.09		3,273,960.00	13,067,968.45	1,604,770.41	17,946,698.86
232,617.42		1,740,216.50	14,412,369.25	796,483.78	16,949,069.53
117,653.84		5,576,512.50	18,047,807.20	191,622.04	23,815,941.74
176,542.90		4,345,542.00	20,606,057.50	343,186.10	25,294,785.60
452,264.83		582,383.00	21,424,636.40	1,215,686.26	23,222,705.66
374,944.14		6,018,958.00	19,742,606.45	912,200.78	26,673,765.23
488,693.61		1,047,031.00	22,474,415.35	1,283,408.49	24,804,854.84
571,828.54		2,144,002.50	17,820,186.60	1,384,792.14	21,348,981.24
470,723.50		1,282,185.00	11,305,716.00	1,312,441.00	13,900,342.00
376,498.32		11,840,202.50	5,251,303.25	961,480.42	18,052,986.17
466,421.95		33,011,980.00	5,023,523.45	1,134,931.70	39,170,435.15
167,521.32		56,887,660.00	1,676,798.20	438,177.92	59,002,636.12
383,436.36		34,716,357.50	2,109,797.00	882,430.56	37,708,585.06
390,572.93		16,960,060.00	11,620,909.70	832,718.93	29,413,688.63
504,663.30		42,080,985.00	7,185,205.65	1,526,100.05	50,792,290.70
498,230.79		14,759,257.50	11,770,359.75	1,124,835.14	27,654,452.39
536,000.31		54,632,750.00	8,214,565.10	1,837,451.86	64,684,766.96
13,347,409.39	39,926.11	941,279,011.50	408,853,532.40	32,685,068.33	1,382,817,612.23

XXX.—COINAGE OF THE MINTS OF THE UNITED STATES

[Coinage of the mint at San Francisco

Calendar years.	GOLD.						SILVER.	
	Double eagles.	Eagles.	Half eagles.	Three dollars.	Quarter eagles.	Dollars.	Dollars.	Trade dollars.
1854.....	\$2,829,360	\$1,238,260	\$1,340	.....	\$615	\$14,632	.....	.....
1855.....	17,593,500	90,000	305,000	\$19,800	.....	.....	.....	.....
1856.....	23,795,000	680,000	525,500	103,500	177,800	24,600	.....	.....
1857.....	19,410,000	260,000	435,000	42,000	170,000	10,000	.....	.....
1858.....	16,934,200	118,000	93,000	.....	3,000	10,000	.....	.....
1859.....	12,728,900	70,000	66,100	.....	38,000	15,000	\$20,000	.....
1860.....	10,899,000	50,000	106,000	21,000	89,000	13,000	.....	.....
1861.....	15,360,000	155,000	90,000	.....	60,000	.....	.....	.....
1862.....	17,083,460	125,000	47,500	.....	20,000	.....	.....	.....
1863.....	19,331,400	100,000	85,000	.....	27,000	.....	.....	.....
1864.....	15,873,200	25,000	19,440	.....	.....	.....	.....	.....
1865.....	20,850,000	167,000	138,060	.....	58,440	.....	.....	.....
1866.....	16,845,000	200,000	219,600	.....	97,400	.....	.....	.....
1867.....	18,415,000	90,000	145,000	.....	70,000	.....	.....	.....
1868.....	16,750,000	135,000	260,000	.....	85,000	.....	.....	.....
1869.....	13,735,000	64,300	155,000	.....	73,750	.....	.....	.....
1870.....	19,640,000	80,000	85,000	.....	40,000	3,000	.....	.....
1871.....	18,560,000	165,000	125,000	.....	55,000	.....	.....	.....
1872.....	15,600,000	173,000	182,000	.....	45,000	.....	9,000	.....
1873.....	20,812,000	120,000	155,000	.....	67,500	.....	700	\$703,000
1874.....	24,280,000	100,000	80,000	.....	.....	.....	.....	2,549,000
1875.....	24,600,000	.....	45,000	.....	29,000	.....	.....	4,487,000
1876.....	31,940,000	50,000	20,000	.....	12,500	.....	.....	5,227,000
1877.....	34,700,000	170,000	133,500	.....	88,500	.....	.....	9,519,000
1878.....	34,780,000	261,000	723,500	.....	445,000	.....	9,774,000	4,162,000
1879.....	24,476,000	2,240,000	2,131,000	.....	108,750	.....	9,110,000	.....
1880.....	16,720,000	5,062,500	6,744,500	.....	.....	.....	8,900,000	.....
1881.....	14,540,000	9,700,000	4,845,000	.....	.....	.....	12,760,000	.....
1882.....	22,500,000	1,320,000	4,845,000	.....	.....	.....	9,250,000	.....
1883.....	23,780,000	380,000	416,000	.....	.....	.....	6,250,000	.....
1884.....	18,320,000	1,242,500	885,000	.....	.....	.....	3,200,000	.....
1885.....	13,670,000	2,280,000	6,057,500	.....	.....	.....	1,497,000	.....
1886.....	.....	8,260,000	16,340,000	.....	.....	.....	750,000	.....
1887.....	5,660,000	8,170,000	9,560,000	.....	.....	.....	1,771,000	.....
1888.....	17,192,000	6,487,000	1,469,500	.....	.....	.....	657,000	.....
1889.....	15,494,000	4,254,000	.....	.....	.....	.....	700,000	.....
1890.....	16,055,000	.....	.....	.....	.....	.....	8,230,373	.....
1891.....	25,762,500	.....	.....	.....	.....	.....	5,296,000	.....
1892.....	18,603,000	1,155,000	1,492,000	.....	.....	.....	1,200,000	.....
1893.....	19,923,500	1,413,500	1,120,000	.....	.....	.....	100,000	.....
1894.....	20,971,000	250,000	279,500	.....	.....	.....	1,260,000	.....
1895.....	22,870,000	490,000	560,000	.....	.....	.....	400,000	.....
1896.....	28,078,500	1,237,500	777,000	.....	.....	.....	5,000,000	.....
1897.....	29,405,000	2,347,500	1,770,000	.....	.....	.....	5,825,000	.....
1898.....	51,503,500	4,736,000	6,987,000	.....	.....	.....	4,102,000	.....
1899.....	40,206,000	8,410,000	7,725,000	.....	.....	.....	2,562,000	.....
Total	929,075,020	74,122,060	78,244,540	186,300	1,861,255	90,232	98,624,073	26,647,000

FROM THEIR ORGANIZATION BY CALENDAR YEARS—Continued.

from its organization, 1854, to December 31, 1899.]

SILVER.					TOTAL COINAGE.		TOTAL VALUE.
Half dollars.	Quarter dollars.	Twenty cents.	Dimes.	Half dimes.	Gold.	Silver.	
					\$4,084,207		\$4,084,207.00
\$64,975.00	\$99,100.00				18,008,300	\$164,075.00	18,172,375.00
105,500.00	71,500.00		\$7,000.00		25,306,400	184,000.00	25,490,400.00
79,000.00	20,500.00				20,327,000	99,500.00	20,426,500.00
238,000.00	30,250.00		6,000.00		17,158,200	274,250.00	17,432,450.00
283,000.00	20,000.00		6,000.00		12,918,000	329,000.00	13,247,000.00
236,000.00	14,000.00		14,000.00		11,178,000	264,000.00	11,442,000.00
469,750.00	24,000.00		17,250.00		15,665,000	511,000.00	16,176,000.00
676,000.00	16,750.00		18,075.00		17,275,960	710,825.00	17,986,785.00
458,000.00			15,750.00	\$5,000	19,543,400	478,750.00	20,022,150.00
329,000.00	5,000.00		23,000.00	4,500	15,917,640	361,500.00	16,279,140.00
337,500.00	10,250.00		17,500.00	6,000	21,213,500	371,250.00	21,584,750.00
527,000.00	7,000.00		13,500.00	6,000	17,362,000	553,500.00	17,915,500.00
593,000.00	12,000.00		14,000.00	6,000	18,720,000	630,000.00	19,350,000.00
580,000.00	24,000.00		26,000.00	14,000	17,230,000	644,000.00	17,874,000.00
328,000.00	19,000.00		45,000.00	11,500	14,028,050	403,500.00	14,431,550.00
502,000.00			5,000.00		19,848,000	507,000.00	20,355,000.00
1,089,000.00	7,725.00		32,000.00	8,050	18,905,000	1,136,775.00	20,041,775.00
290,000.00	20,750.00		19,000.00	41,850	16,000,000	380,600.00	16,380,600.00
116,500.00	39,000.00		45,500.00	16,200	21,154,500	920,900.00	22,075,400.00
197,000.00	98,000.00		24,000.00		24,460,000	2,868,000.00	27,328,000.00
1,600,000.00	170,000.00	\$231,000	907,000.00		24,674,000	7,395,000.00	32,069,000.00
2,264,000.00	2,149,000.00		1,042,000.00		32,022,500	10,682,000.00	42,704,500.00
2,678,000.00	2,249,000.00		234,000.00		35,092,000	14,680,000.00	49,772,000.00
6,000.00	35,000.00				36,209,500	13,977,000.00	50,186,500.00
					28,955,750	9,110,000.00	38,065,750.00
					28,527,000	8,900,000.00	37,427,000.00
					29,085,000	12,760,000.00	41,845,000.00
					28,665,000	9,250,000.00	37,915,000.00
					24,576,000	6,250,000.00	30,826,000.00
			56,496.90		20,447,500	3,253,496.90	23,703,996.90
			4,369.00		22,007,500	1,501,369.00	23,508,869.00
			20,652.40		24,600,000	770,652.40	25,370,652.40
			445,445.00		23,390,000	2,216,445.00	25,606,445.00
	304,000.00		172,000.00		25,148,500	1,133,000.00	26,281,500.00
			97,267.80		19,748,000	797,267.80	20,545,267.80
			142,307.60		16,055,000	8,372,680.60	24,427,680.60
	554,000.00		319,611.60		25,762,500	6,169,611.60	31,932,111.60
514,514.00	241,019.75		99,071.00		21,250,000	2,054,604.75	23,304,604.75
370,000.00	363,633.75		249,140.10		22,457,000	1,082,773.85	23,539,773.85
2,024,345.00	662,205.25		2.40		21,500,500	3,946,552.65	25,447,052.65
554,043.00	441,170.25		112,000.00		23,920,000	1,507,213.25	25,427,213.25
570,474.00	47,009.75		57,505.60		30,093,000	5,674,989.35	35,767,989.35
466,950.00	135,557.25		134,284.40		33,522,500	6,561,791.65	40,084,291.65
1,179,275.00	255,148.00		170,250.70		63,226,500	5,706,673.70	68,933,173.70
843,205.50	177,000.00		186,749.30		56,341,000	3,768,954.80	60,109,954.80
20,575,031.50	8,322,569.00	231,000	4,798,728.80	119,100	1,083,579,407	159,317,502.30	1,242,896,909.30

XXX.—COINAGE OF THE MINTS OF THE UNITED STATES

[Coinage of the mint at New Orleans from its organization, 1838, to

Calendar years.	GOLD.						SILVER.
	Double eagles.	Eagles.	Half eagles.	Three dollars.	Quarter eagles.	Dollars.	Dollars.
1838							
1839					\$14,452.50		
1840			\$152,000		65,500.00		
1841		\$25,000	41,750		18,450.00		
1842		274,000	82,000		49,500.00		
1843		1,751,620	505,375		920,005.00		
1844		1,187,000	1,823,000				
1845		475,000	205,000				
1846		817,800	290,000		165,000.00		\$59,000
1847		5,715,000	60,000		310,000.00		
1848		358,500					
1849		239,000				\$215,000	
1850	\$2,820,000	575,000			210,000.00	14,000	40,000
1851	6,300,000	2,630,000	205,000		370,000.00	290,000	
1852	3,800,000	180,000			350,000.00	140,000	
1853	1,420,000	510,000				290,000	
1854	65,000	525,000	230,000	\$72,000	382,500.00		
1855	160,000	180,000	55,500			55,000	
1856	45,000	145,000	50,000		52,750.00		
1857	600,000	55,000	65,000		85,000.00		
1858	795,000	200,000					
1859	182,000	23,000					360,000
1860	132,000	111,000					515,000
1861 ^a	100,000						
1879	46,500	15,000					2,887,000
1880		92,000					5,305,000
1881		83,500					5,708,000
1882		108,200					6,090,000
1883		8,000					8,725,000
1884							9,730,000
1885							9,185,000
1886							10,710,000
1887							11,550,000
1888		213,350					12,150,000
1889							11,875,000
1890							10,701,000
1891							7,954,529
1892		286,880	50,000				2,744,000
1893		170,000	550,000				300,000
1894		1,075,000	83,000				1,723,000
1895		980,000					450,000
1896							4,900,000
1897		425,000					4,004,000
1898							4,440,000
1899		370,470					12,290,000
Total.....	16,375,500	19,804,320	4,447,625	72,000	3,023,157.50	1,004,000	144,395,529

^a No coinage from 1862 to 1878, inclusive.

FROM THEIR ORGANIZATION, BY CALENDAR YEARS—Continued.

its suspension, 1861, and from its reopening, 1879, to December 31, 1899.]

SILVER.					TOTAL COINAGE.		TOTAL VALUE.
Half dollars.	Quarter dollars.	Dimes.	Half dimes.	Three cents.	Gold.	Silver.	
		\$40,243.40				\$40,243.40	\$40,243.40
\$81,488		124,327.20	\$54,827.50		\$44,452.50	260,642.70	305,095.20
427,550	\$106,300	117,500.00	46,750.00		217,500.00	698,100.00	915,600.00
200,500	113,000	200,750.00	40,750.00		85,200.00	555,000.00	640,200.00
478,500	192,250	202,000.00	17,500.00		405,500.00	890,250.00	1,295,750.00
1,134,000	242,000	15,000.00			3,177,000.00	1,391,000.00	4,568,000.00
1,002,500	185,000		11,000.00		3,010,000.00	1,198,500.00	4,208,500.00
1,047,000		23,000.00			680,000.00	1,070,000.00	1,750,000.00
1,152,000					1,272,800.00	1,211,000.00	2,483,800.00
1,292,000	92,000				6,085,000.00	1,384,000.00	7,469,000.00
1,590,000			30,000.00		358,500.00	1,620,000.00	1,978,500.00
1,155,000		30,000.00	7,000.00		454,000.00	1,192,000.00	1,646,000.00
1,228,000	103,000	51,000.00	34,500.00		3,619,000.00	1,456,500.00	5,075,500.00
201,000	22,000	40,000.00	43,000.00	\$21,600	9,795,000.00	327,600.00	10,122,600.00
72,000	24,000	43,000.00	13,000.00		4,470,000.00	152,000.00	4,622,000.00
664,000	333,000	110,000.00	118,000.00		2,220,000.00	1,225,000.00	3,445,000.00
2,620,000	371,000	177,000.00	78,000.00		1,274,500.00	3,246,000.00	4,520,500.00
1,844,000	44,000		30,000.00		450,500.00	1,918,000.00	2,368,500.00
1,329,000	242,000	118,000.00	55,000.00		292,750.00	1,744,000.00	2,036,750.00
409,000	295,000	154,000.00	69,000.00		805,000.00	927,000.00	1,732,000.00
3,647,000	130,000	29,000.00	83,000.00		905,000.00	3,889,000.00	4,794,000.00
1,417,000	65,000	48,000.00	28,000.00		205,000.00	1,918,000.00	2,123,000.00
645,000	97,000	4,000.00	53,000.00		243,000.00	1,314,000.00	1,557,000.00
165,000					100,000.00	165,000.00	265,000.00
					61,500.00	2,887,000.00	2,948,500.00
					92,000.00	5,305,000.00	5,397,000.00
					83,500.00	5,708,000.00	5,791,500.00
					108,200.00	6,090,000.00	6,198,200.00
					8,000.00	8,725,000.00	8,733,000.00
						9,730,000.00	9,730,000.00
						9,185,000.00	9,185,000.00
						10,710,000.00	10,710,000.00
						11,550,000.00	11,550,000.00
					213,350.00	12,150,000.00	12,363,350.00
						11,875,000.00	11,875,000.00
						10,701,000.00	10,701,000.00
	17,000	454,000.00				8,425,529.00	8,425,529.00
195,000	660,000	384,170.00			336,880.00	3,983,170.00	4,320,050.00
694,500	849,000	176,000.00			720,000.00	2,019,500.00	2,739,500.00
1,069,000	713,000	72,000.00			1,158,000.00	3,577,000.00	4,735,000.00
883,000	704,000	44,000.00			980,000.00	2,081,000.00	3,061,000.00
462,000	371,000	61,000.00				5,794,000.00	5,794,000.00
316,000	353,700	66,600.00			425,000.00	4,740,300.00	5,165,300.00
437,000	467,000	213,000.00				5,557,000.00	5,557,000.00
862,000	661,000	265,000.00			370,470.00	14,078,000.00	14,448,470.00
28,720,038	7,452,250	3,262,590.60	812,327.50	21,600	44,726,602.50	184,664,335.10	229,390,937.60

XXX.—COINAGE OF THE MINTS OF THE UNITED STATES

[Coinage of the mint at Carson City

Calendar years.	GOLD.			SILVER.	
	Double eagles.	Eagles.	Half eagles.	Dollars.	Trade dollars.
1870.....	\$75,780	\$59,080	\$38,375	\$12,462	.....
1871.....	293,740	71,850	103,850	1,376	.....
1872.....	593,000	55,000	84,900	3,150	.....
1873.....	448,200	45,430	37,080	2,300	\$124,500
1874.....	2,301,700	167,670	105,990	.....	1,373,200
1875.....	2,223,020	77,150	59,140	.....	1,573,700
1876.....	2,768,820	46,960	34,435	.....	509,000
1877.....	851,300	33,320	43,400	.....	534,000
1878.....	263,600	32,440	45,270	2,212,000	97,000
1879.....	214,160	17,620	86,405	756,000	.....
1880.....	.....	111,900	255,085	591,000	.....
1881.....	.....	240,150	69,430	296,000	.....
1882.....	782,800	67,640	414,085	1,133,000	.....
1883.....	1,199,240	120,000	64,790	1,204,000	.....
1884.....	1,622,780	99,250	82,010	1,136,000	.....
1885.....	189,000	.....	.....	228,000	.....
1886 <i>a</i>.....	.....	.....	.....	.....	.....
1887 <i>a</i>.....	.....	.....	.....	.....	.....
1888 <i>a</i>.....	.....	.....	.....	.....	.....
1889 <i>b</i>	618,900	.....	.....	350,000	.....
1890.....	1,824,180	175,000	269,000	2,309,041	.....
1891.....	100,000	1,037,320	1,040,000	1,618,000	.....
1892.....	545,300	400,000	414,840	1,352,000	.....
1893 <i>c</i>	368,040	140,000	300,000	677,000	.....
Total.....	17,283,560	2,997,780	3,548,085	13,881,329	4,211,400

a Coinage suspended.

b Operations resumed October 1, 1889.

XXX.—COINAGE OF THE MINTS OF THE UNITED STATES

[Coinage of the mint at Charlotte, N. C., from its organization, 1838, to its suspension, 1861.]

Calendar years.	GOLD.			TOTAL VALUE.
	Half eagles.	Quarter eagles.	Dollars.	
1838.....	\$64,365	\$19,770.00	.....	\$84,335.00
1839.....	117,335	45,432.50	.....	162,767.50
1840.....	95,140	32,095.00	.....	127,235.00
1841.....	107,555	25,742.50	.....	133,297.50
1842.....	137,400	16,842.50	.....	154,242.50
1843.....	221,765	65,240.00	.....	287,005.00
1844 <i>a</i>	118,155	29,055.00	.....	147,210.00
1845 <i>b</i>.....	.....	.....	.....	.....
1846.....	64,975	12,020.00	.....	76,995.00
1847.....	420,755	58,065.00	.....	478,820.00
1848.....	322,360	41,970.00	.....	364,330.00
1849.....	324,115	25,550.00	\$11,634	361,299.00
1850.....	317,955	22,870.00	6,966	347,791.00
1851.....	245,880	37,307.50	41,267	324,454.50
1852.....	362,870	24,430.00	9,434	396,734.00
1853.....	327,855	.....	11,515	339,370.00
1854.....	196,455	18,237.50	4	214,696.50
1855.....	198,940	9,192.50	9,803	217,935.50
1856.....	142,285	19,782.50	.....	162,067.50
1857.....	156,800	.....	13,280	170,080.00
1858.....	194,280	22,640.00	.....	216,920.00
1859.....	159,235	.....	5,235	164,470.00
1860.....	74,065	18,672.50	.....	92,737.50
1861.....	34,395	.....	.....	34,395.00
Total.....	4,405,135	544,915.00	109,138	5,059,188.00

a Mint burned July 27, 1844.

b No coinage.

FROM THEIR ORGANIZATION, BY CALENDAR YEARS—Continued.

from its organization, 1870, to June 30, 1893.]

SILVER.				TOTAL COINAGE.		TOTAL VALUE.
Half dollars.	Quarter dollars.	Twenty cents.	Dimes.	Gold.	Silver.	
\$27,308.50	\$2,085.00	.....	.....	\$173,235	\$41,855.50	\$215,090.50
69,975.00	2,722.50	.....	\$2,010.00	469,440	76,083.50	545,523.50
136,000.00	2,275.00	.....	2,400.00	732,900	143,825.00	876,725.00
168,530.00	4,115.50	.....	3,119.10	530,710	302,564.60	833,274.60
29,500.00	.....	.....	1,081.70	2,575,360	1,403,781.70	3,979,141.70
504,000.00	35,000.00	\$26,658	464,500.00	2,359,310	2,603,858.00	4,963,168.00
978,000.00	1,236,000.00	2,000	827,000.00	2,850,215	3,552,000.00	6,402,215.00
710,000.00	1,048,000.00	.....	770,000.00	928,020	3,062,000.00	3,990,020.00
31,000.00	249,000.00	.....	20,000.00	341,310	2,609,000.00	2,950,310.00
.....	.....	.....	.....	318,185	756,000.00	1,074,185.00
.....	.....	.....	.....	366,985	591,000.00	957,985.00
.....	.....	.....	.....	309,580	296,000.00	605,580.00
.....	.....	.....	.....	1,264,525	1,133,000.00	2,397,525.00
.....	.....	.....	.....	1,384,030	1,204,000.00	2,588,030.00
.....	.....	.....	.....	1,804,040	1,136,000.00	2,940,040.00
.....	.....	.....	.....	189,000	228,000.00	417,000.00
.....						
.....	.....	.....	.....	618,900	350,000.00	968,900.00
.....	.....	.....	.....	2,268,180	2,309,041.00	4,577,221.00
.....	.....	.....	.....	2,177,320	1,618,000.00	3,795,320.00
.....	.....	.....	.....	1,360,140	1,352,000.00	2,712,140.00
.....	.....	.....	.....	808,040	677,000.00	1,485,040.00
2,654,313.50	2,579,198.00	28,658	2,090,110.80	23,829,425	25,445,009.30	49,274,434.30

c Coinage suspended from May 23, 1893.

FROM THEIR ORGANIZATION, BY CALENDAR YEARS—Continued.

[Coinage of the mint at Dahlonega, Ga., from its organization, 1838, to its suspension, 1861.]

Calendar years.	GOLD.				TOTAL VALUE.
	Half eagles.	Three dollars.	Quarter eagles.	Dollars.	
1838.....	\$102,915	.....	.....	.....	\$102,915.00
1839.....	94,695	.....	\$34,185.00	.....	128,880.00
1840.....	114,480	.....	8,830.00	.....	123,310.00
1841.....	152,475	.....	10,410.00	.....	162,885.00
1842.....	298,040	.....	11,607.50	.....	309,647.50
1843.....	492,260	.....	90,522.50	.....	582,782.50
1844.....	444,910	.....	43,330.00	.....	488,240.00
1845.....	453,145	.....	48,650.00	.....	501,795.00
1846.....	401,470	.....	48,257.50	.....	449,727.50
1847.....	322,025	.....	39,460.00	.....	361,485.00
1848.....	237,325	.....	34,427.50	.....	271,752.50
1849.....	195,180	.....	27,362.50	\$21,588	244,130.50
1850.....	219,750	.....	30,370.00	8,382	258,502.00
1851.....	313,550	.....	28,160.00	9,882	351,592.00
1852.....	457,260	.....	10,195.00	6,360	473,815.00
1853.....	448,390	.....	7,945.00	6,583	462,918.00
1854.....	282,065	\$3,360	4,400.00	2,935	292,760.00
1855.....	112,160	.....	2,807.50	1,811	116,778.50
1856.....	98,930	.....	2,185.00	1,460	102,575.00
1857.....	85,230	.....	5,910.00	3,533	94,673.00
1858.....	76,810	.....	.....	3,477	80,287.00
1859.....	51,830	.....	5,610.00	4,952	62,392.00
1860.....	73,175	.....	.....	1,566	74,741.00
1861.....	7,985	.....	.....	.....	7,985.00
Total	5,536,055	3,360	494,625.00	72,529	6,106,569.00

XXX.—COINAGE OF THE MINTS OF THE UNITED STATES
RECAPITULATION.

Calendar years.	GOLD COINAGE.					
	Double eagles.	Eagles.	Half eagles.	Three dollars.	Quarter eagles.	Dollars.
1793-95.....		\$27, 950	\$43, 535			
1796.....		60, 809	16, 995		\$165. 00	
1797.....		91, 770	32, 030		4, 390. 00	
1798.....		79, 740	124, 335		1, 535. 00	
1799.....		174, 830	37, 255		1, 200. 00	
1800.....		259, 650	58, 110			
1801.....		292, 540	130, 030			
1802.....		150, 900	265, 880		6, 530. 00	
1803.....		89, 790	167, 530		1, 057. 50	
1804.....		97, 950	152, 375		8, 317. 50	
1805.....			165, 915		4, 452. 50	
1806.....			320, 465		4, 040. 00	
1807.....			420, 465		17, 030. 00	
1808.....			277, 890		6, 775. 00	
1809.....			169, 375			
1810.....			501, 435			
1811.....			497, 905			
1812.....			290, 435			
1813.....			477, 140			
1814.....			77, 270			
1815.....			3, 175			
1816.....						
1817.....						
1818.....			242, 940			
1819.....			258, 615			
1820.....			1, 319, 030			
1821.....			173, 205		16, 120. 00	
1822.....			88, 980			
1823.....			72, 425			
1824.....			86, 700		6, 500. 00	
1825.....			145, 300		11, 085. 00	
1826.....			90, 345		1, 900. 00	
1827.....			124, 565		7, 000. 00	
1828.....			140, 145			
1829.....			287, 210		8, 507. 50	
1830.....			631, 755		11, 350. 00	
1831.....			702, 970		11, 300. 00	
1832.....			787, 435		11, 000. 00	
1833.....			968, 150		10, 400. 00	
1834.....			3, 660, 845		293, 425. 00	
1835.....			1, 857, 670		328, 505. 00	
1836.....			2, 765, 735		1, 369, 965. 00	
1837.....			1, 035, 605		112, 700. 00	
1838.....		72, 000	1, 600, 420		137, 345. 00	
1839.....		382, 480	802, 745		191, 622. 50	
1840.....		473, 380	1, 048, 530		153, 572. 50	
1841.....		656, 310	380, 945		54, 602. 50	
1842.....		1, 089, 070	655, 330		85, 007. 50	
1843.....		2, 506, 240	4, 275, 425		1, 327, 132. 50	
1844.....		1, 250, 610	4, 087, 715		89, 345. 00	
1845.....		736, 530	2, 743, 640		276, 277. 50	
1846.....		1, 018, 750	2, 736, 155		279, 272. 50	
1847.....		14, 337, 580	5, 382, 685		482, 060. 00	
1848.....		1, 813, 340	1, 863, 560		98, 612. 50	
1849.....		6, 775, 180	1, 184, 645		111, 147. 50	\$936, 789
1850.....	\$26, 225, 220	3, 489, 510	860, 160		895, 547. 50	511, 301
1851.....	48, 043, 100	4, 393, 280	2, 651, 955		3, 867, 337. 50	3, 658, 820
1852.....	44, 860, 520	2, 811, 060	3, 689, 635		3, 283, 827. 50	2, 201, 145
1853.....	26, 646, 520	2, 522, 530	2, 305, 095		3, 519, 615. 00	4, 384, 149
1854.....	18, 052, 340	2, 305, 760	1, 513, 235	\$491, 214	1, 896, 397. 50	1, 657, 016
1855.....	25, 046, 820	1, 487, 010	1, 257, 090	171, 465	600, 700. 00	824, 883
1856.....	30, 437, 560	1, 429, 900	1, 806, 665	181, 530	1, 213, 117. 50	1, 788, 996
1857.....	28, 797, 500	481, 060	1, 232, 970	104, 673	796, 235. 00	801, 602
1858.....	21, 873, 480	343, 210	439, 770	6, 399	144, 082. 50	131, 472
1859.....	13, 782, 840	253, 930	361, 235	46, 914	142, 220. 00	193, 431
1860.....	22, 584, 400	278, 830	352, 365	42, 465	164, 360. 00	51, 234
1861.....	74, 989, 060	1, 287, 330	3, 332, 130	18, 216	3, 241, 295. 00	527, 499
1862.....	18, 926, 120	234, 950	69, 825	17, 355	300, 882. 50	1, 326, 865
1863.....	22, 187, 200	112, 480	97, 360	15, 117	27, 075. 00	6, 250
1864.....	19, 958, 900	60, 800	40, 540	8, 040	7, 185. 00	5, 950
1865.....	27, 874, 000	207, 050	144, 535	3, 495	62, 302. 50	3, 725
1866.....	30, 820, 500	237, 800	253, 200	12, 090	105, 175. 00	7, 180
1867.....	23, 436, 300	121, 400	179, 600	7, 950	78, 125. 00	5, 250
1868.....	18, 722, 000	241, 550	288, 625	14, 625	94, 062. 50	10, 525
1869.....	17, 238, 100	82, 850	163, 925	7, 575	84, 612. 50	5, 925
Carried forward.....	560, 502, 480	54, 819, 680	67, 470, 880	1, 149, 123	26, 065, 402. 50	19, 040, 007

FROM THEIR ORGANIZATION, BY CALENDAR YEARS—Continued.

RECAPITULATION.

SILVER COINAGE.							
Trade dollars.	Dollars.	Half dollars.	Quarter dollars.	Twenty cents.	Dimes.	Half dimes.	Three cents.
	\$204,791	\$161,572.00				\$4,320.80	
	72,920		\$1,473.50		\$2,213.50	511.50	
	7,776	1,959.00	63.00		2,526.10	2,226.35	
	327,536				2,755.00		
	423,515						
	220,920				2,176.00	1,200.00	
	54,454	15,144.50			3,464.00	1,695.50	
	41,650	14,945.00			1,097.50	650.50	
	66,064	15,857.50			3,304.00	1,892.50	
	19,570	78,259.50	1,684.50		826.50		
	321	105,861.00	30,348.50		12,078.00	780.00	
		419,788.00	51,531.00				
		525,788.00	55,160.75		16,500.00		
		684,300.00					
		702,905.00			4,471.00		
		638,138.00			635.50		
		601,822.00			6,518.00		
		814,029.50					
		620,951.50					
		519,537.50			42,150.00		
			17,308.00				
		23,575.00	5,000.75				
		607,783.50					
		980,161.00	90,293.50				
		1,104,000.00	36,000.00				
		375,561.00	31,861.00		94,258.70		
		652,898.50	54,212.75		118,651.20		
		779,786.50	16,020.00		10,000.00		
		847,100.00	4,450.00		44,000.00		
		1,752,477.00					
		1,471,583.00	42,000.00		51,000.00		
		2,002,090.00					
		2,746,700.00	1,000.00		121,500.00		
		1,537,600.00	25,500.00		12,500.00		
		1,856,078.00			77,000.00	61,500.00	
		2,382,400.00			51,000.00	62,000.00	
		2,936,830.00	99,500.00		77,135.00	62,135.00	
		2,398,500.00	80,000.00		52,250.00	48,250.00	
		2,603,000.00	39,000.00		48,500.00	68,500.00	
		3,206,002.00	71,500.00		63,500.00	74,000.00	
		2,676,003.00	488,000.00		141,000.00	138,000.00	
	1,000	3,273,100.00	118,000.00		119,000.00	95,000.00	
		1,814,910.00	63,100.00		104,200.00	113,800.00	
		1,773,000.00	208,000.00		239,493.40	112,750.00	
	300	1,748,768.00	122,786.50		229,638.70	108,285.00	
	61,005	1,145,054.00	153,331.75		253,358.00	113,954.25	
	173,000	355,500.00	143,000.00		363,000.00	98,250.00	
	184,618	1,484,882.00	214,250.00		390,750.00	58,250.00	
	165,100	3,056,000.00	403,400.00		152,000.00	58,250.00	
	20,000	1,885,500.00	290,300.00		7,250.00	32,500.00	
	24,500	1,341,500.00	230,500.00		198,500.00	78,200.00	
	169,600	2,257,000.00	127,500.00		3,130.00	1,350.00	
	140,750	1,870,000.00	275,500.00		24,500.00	63,700.00	
	15,000	1,880,000.00	36,500.00		45,150.00	63,400.00	
	62,600	1,781,000.00	85,000.00		113,900.00	72,450.00	
	47,500	1,341,500.00	150,700.00		244,150.00	82,250.00	
	1,300	301,375.00	62,000.00		142,650.00	82,050.00	\$185,022.00
	1,100	110,565.00	68,265.00		196,550.00	63,025.00	559,905.00
	46,110	2,430,354.00	4,146,555.00		1,327,301.00	785,251.00	342,000.00
	33,140	4,111,000.00	3,466,000.00		624,000.00	365,000.00	20,130.00
	26,000	2,288,725.00	857,350.00		207,500.00	117,500.00	4,170.00
	63,500	1,903,500.00	2,129,500.00		703,000.00	299,000.00	43,740.00
	94,000	1,482,000.00	2,726,500.00		712,000.00	433,000.00	31,260.00
		5,998,000.00	2,002,250.00		189,000.00	258,000.00	48,120.00
	636,500	2,074,000.30	421,000.00		97,000.00	45,000.00	10,950.00
	733,930	1,032,850.00	312,350.00		78,700.00	92,950.00	8,610.00
	78,500	2,078,950.00	1,237,650.00		209,650.00	164,050.00	14,940.00
	12,090	802,175.00	249,887.50		102,830.00	74,627.50	10,906.50
	27,660	709,830.00	48,015.00		17,196.00	5,923.00	643.80
	31,170	518,785.00	28,517.50		26,907.00	4,523.50	14.10
	47,000	593,450.00	25,075.00		18,550.00	6,675.00	255.00
	49,625	899,812.50	11,381.25		14,372.50	6,536.25	681.75
	60,325	810,162.50	17,156.25		14,662.50	6,431.25	138.75
	182,700	769,100.00	31,500.00		72,625.00	18,295.00	123.00
	424,300	725,950.00	23,150.00		70,660.00	21,930.00	153.00
	5,053,440	95,509,284.50	21,727,878.00		8,376,184.10	4,529,818.90	1,281,762.90

XXX.—COINAGE OF THE MINTS OF THE UNITED STATES
RECAPITULATION—Continued.

Calendar years.	GOLD COINAGE.					
	Double eagles.	Eagles.	Half eagles.	Three dollars.	Quarter eagles.	Dollars.
Brought forward	\$560,502,480	\$54,819,680	\$67,470,880	\$1,149,123	\$26,065,402.50	\$19,040,007
1870.	22,819,480	164,430	143,550	10,605	51,387.50	9,335
1871.	20,456,740	254,650	245,000	3,990	68,375.00	3,930
1872.	21,230,600	244,500	275,350	6,090	52,575.00	3,530
1873.	55,456,700	173,680	754,605	75	512,562.50	125,125
1874.	33,917,700	799,270	203,530	125,460	9,850.00	198,820
1875.	32,737,820	78,350	105,240	60	30,050.00	420
1876.	46,386,920	104,280	61,820	135	23,052.50	3,245
1877.	43,504,700	211,490	182,660	4,464	92,630.00	3,920
1878.	45,916,500	1,031,440	1,427,470	246,972	1,160,650.00	3,020
1879.	28,889,260	6,120,320	3,727,155	9,090	331,225.00	3,030
1880.	17,749,120	21,715,160	22,831,765	3,108	7,490.00	1,636
1881.	14,585,200	48,796,250	33,458,430	1,650	1,700.00	7,660
1882.	23,295,400	24,740,640	17,831,885	4,620	10,100.00	5,040
1883.	24,980,040	2,595,400	1,647,990	2,820	4,900.00	10,840
1884.	19,944,200	2,110,800	1,922,250	3,318	4,982.50	6,206
1885.	13,875,560	4,815,270	9,065,030	2,730	2,217.50	12,205
1886.	22,120	10,621,600	18,282,160	3,426	10,220.00	6,016
1887.	5,662,420	8,706,800	9,560,435	18,480	15,705.00	8,543
1888.	21,717,320	8,030,310	1,560,980	15,873	40,245.00	16,080
1889.	16,995,120	4,298,850	37,825	7,287	44,120.00	30,729
1890.	19,399,080	755,430	290,640	.....	22,032.50	.....
1891.	25,891,340	1,956,000	1,347,065	.....	27,600.00	.....
1892.	19,238,760	9,817,400	5,724,700	.....	6,362.50	.....
1893.	27,178,320	20,132,450	9,610,985	.....	75,265.00	.....
1894.	48,350,800	26,032,780	5,152,275	.....	10,305.00	.....
1895.	45,163,120	7,148,260	7,289,680	.....	15,297.50	.....
1896.	43,931,760	2,000,980	1,072,315	.....	48,005.00	.....
1897.	57,070,220	12,774,090	6,109,415	.....	74,760.00	.....
1898.	54,912,900	12,857,970	10,154,475	.....	60,412.50	.....
1899.	73,593,680	21,403,520	16,278,645	.....	68,375.00	.....
Total	1,485,375,380	315,312,050	253,826,205	1,619,376	28,947,855.00	19,499,337

a Includes \$475,000 in Columbian coins.

b Includes \$2,026,052.50 in Columbian coins.

FROM THEIR ORGANIZATION, BY CALENDAR YEARS—Continued.

RECAPITULATION—Continued.

SILVER COINAGE.							
Trade dollars.	Dollars.	Half dollars.	Quarter dollars.	Twenty cents.	Dimes.	Half dimes.	Three cents.
.....	\$5,053,440	\$95,509,281.50	\$21,727,878.00	.....	\$8,376,184.10	\$4,529,818.90	\$1,281,762.90
.....	445,462	829,758.50	23,935.00	.....	52,150.00	26,830.00	120.00
.....	1,117,136	1,741,655.00	53,255.50	.....	109,371.00	82,493.00	127.80
.....	1,118,600	866,775.00	68,762.50	.....	261,045.00	189,247.50	58.50
\$1,225,000	296,600	1,593,780.00	414,190.50	.....	443,329.10	51,830.00	18.00
4,910,000	.....	1,406,650.00	215,975.00	.....	319,151.70	.....	.....
6,279,600	.....	5,117,750.00	1,278,375.00	\$265,598	2,406,570.00	.....	.....
6,192,150	.....	7,451,575.00	7,839,287.50	5,180	3,015,115.00	.....	.....
13,092,710	.....	7,540,255.00	6,024,927.50	102	1,735,051.00	.....	.....
4,259,900	22,495,550	726,200.00	849,200.00	120	187,880.00	.....	.....
1,541	27,560,100	2,950.00	3,675.00	.....	1,510.00	.....	.....
1,987	27,397,355	4,877.50	3,738.75	.....	3,735.50	.....	.....
960	27,927,975	5,487.50	3,243.75	.....	2,497.50	.....	.....
1,097	27,574,100	2,750.00	4,075.00	.....	391,110.00	.....	.....
979	28,470,039	4,519.50	3,859.75	.....	767,571.20	.....	.....
.....	28,136,875	2,637.50	2,218.75	.....	393,134.90	.....	.....
.....	28,697,767	3,065.00	3,632.50	.....	257,711.70	.....	.....
.....	31,423,886	2,943.00	1,471.50	.....	658,409.40	.....	.....
.....	33,611,710	2,855.00	2,677.50	.....	1,573,838.90	.....	.....
.....	31,990,833	6,416.50	306,708.25	.....	721,648.70	.....	.....
.....	34,651,811	6,355.50	3,177.75	.....	835,338.90	.....	.....
.....	38,043,004	6,295.00	20,147.50	.....	1,133,461.70	.....	.....
.....	23,562,735	100,300.00	1,551,150.00	.....	2,304,671.60	.....	.....
.....	6,333,245	a 1,652,136.50	2,960,331.00	.....	1,695,365.50	.....	.....
.....	1,455,792	b 4,003,948.50	c 2,583,837.50	.....	759,219.30	.....	.....
.....	3,093,972	3,667,831.00	2,233,448.25	.....	205,099.60	.....	.....
.....	862,880	2,354,652.00	2,255,390.25	.....	225,088.00	.....	.....
.....	19,876,762	1,507,855.00	1,386,700.25	.....	318,581.80	.....	.....
.....	12,651,731	2,023,315.50	2,524,440.00	.....	1,287,810.80	.....	.....
.....	14,426,735	3,094,642.50	3,497,331.75	.....	2,015,324.20	.....	.....
.....	15,182,846	4,474,628.50	3,994,211.50	.....	2,409,833.90	.....	.....
35,965,924	493,458,941	145,714,144.50	61,841,253.00	271,000	34,866,810.00	4,880,219.40	1,282,087.20

c Includes \$10,005.75 in Columbian coins.

XXX.—COINAGE OF THE MINTS OF THE UNITED STATES
RECAPITULATION—Continued.

Calendar years.	MINOR COINAGE.		
	Five cents.	Three cents.	Two cents.
1793-1795			
1796			
1797			
1798			
1799			
1800			
1801			
1802			
1803			
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1863			
1864			\$396, 950. 00
1865		\$341, 460. 00	272, 800. 00
1866	\$737, 125. 00	144, 030. 00	63, 540. 00
1867	1, 545, 475. 00	117, 450. 00	58, 775. 00
1868	1, 440, 850. 00	97, 560. 00	56, 075. 00
1869	819, 750. 00	48, 120. 00	30, 930. 00
Carried forward.....	4, 543, 200. 00	748, 620. 00	879, 070. 00

FROM THEIR ORGANIZATION, BY CALENDAR YEARS—Continued.

RECAPITULATION—Continued.

MINOR COINAGE.		TOTAL COINAGE.			TOTAL VALUE.
Cents.	Half cents.	Gold.	Silver.	Minor.	
\$10,660.33	\$712.67	\$71,485.00	\$370,683.80	\$11,373.00	\$453,541.80
9,747.00	577.40	77,960.00	77,118.50	10,324.40	165,402.90
8,975.10	535.24	128,190.00	14,550.45	9,510.34	152,250.79
9,797.00	.....	205,610.00	330,291.00	9,797.00	545,698.00
9,045.85	60.83	213,285.00	423,515.00	9,106.68	645,906.68
28,224.75	1,057.65	317,760.00	224,296.00	29,279.40	571,335.40
13,628.37	.....	422,570.00	74,758.00	13,628.37	510,956.37
34,351.00	71.83	423,310.00	58,343.00	34,422.83	516,075.83
24,713.53	489.50	258,377.50	87,118.00	25,203.03	370,698.53
7,568.38	5,276.56	258,642.50	100,340.50	12,844.94	371,827.94
9,411.16	4,072.32	170,367.50	149,388.50	13,483.48	333,239.48
3,480.00	1,780.00	324,505.00	471,319.00	5,260.00	801,084.00
7,272.21	2,380.00	437,495.00	597,448.75	9,652.21	1,044,595.96
11,090.00	2,000.00	284,665.00	684,300.00	13,090.00	982,055.00
2,228.67	5,772.86	169,375.00	707,376.00	8,001.53	884,752.53
14,585.00	1,075.00	501,435.00	638,773.50	15,660.00	1,155,868.50
2,180.25	315.70	497,905.00	608,340.00	2,495.95	1,108,740.95
10,755.00	.....	290,435.00	814,029.50	10,755.00	1,115,219.50
4,180.00	.....	477,140.00	620,951.50	4,180.00	1,102,271.50
3,578.30	.....	77,270.00	561,687.50	3,578.30	642,535.80
.....	.....	3,175.00	17,308.00	.....	20,483.00
28,209.82	.....	.....	28,575.75	28,209.82	56,785.57
39,484.00	.....	.....	607,783.50	39,484.00	647,267.50
31,670.00	.....	242,940.00	1,070,454.50	31,670.00	1,345,064.50
26,710.00	.....	258,615.00	1,140,000.00	26,710.00	1,425,325.00
44,075.50	.....	1,319,030.00	501,680.70	44,075.50	1,864,786.20
3,890.00	.....	189,325.00	825,762.45	3,890.00	1,018,977.45
20,723.39	.....	88,980.00	805,806.50	20,723.39	915,509.89
.....	.....	72,425.00	895,550.00	.....	967,975.00
12,620.00	.....	93,200.00	1,752,477.00	12,620.00	1,858,297.00
14,611.00	315.00	156,385.00	1,564,583.00	14,926.00	1,735,894.00
15,174.25	1,170.00	92,245.00	2,002,090.00	16,344.25	2,110,679.25
23,577.32	.....	131,565.00	2,869,200.00	23,577.32	3,024,342.32
22,606.24	3,030.00	140,145.00	1,575,600.00	25,636.24	1,741,381.24
14,145.00	2,435.00	295,717.50	1,994,578.00	16,580.00	2,306,875.50
17,115.00	.....	643,105.00	2,495,400.00	17,115.00	3,155,620.00
33,592.60	11.00	714,270.00	3,175,600.00	33,603.60	3,923,473.60
23,620.00	.....	798,435.00	2,579,000.00	23,620.00	3,401,055.00
27,390.00	770.00	978,550.00	2,759,000.00	28,160.00	3,765,710.00
18,551.00	600.00	3,954,270.00	3,415,002.00	19,151.00	7,388,423.00
38,784.00	705.00	2,186,175.00	3,443,003.00	39,489.00	5,668,667.00
21,110.00	1,990.00	4,135,700.00	3,606,100.00	23,100.00	7,764,900.00
55,583.00	.....	1,148,305.00	2,096,010.00	55,583.00	3,299,898.00
63,702.00	.....	1,809,765.00	2,333,243.40	63,702.00	4,206,710.40
31,286.61	.....	1,376,847.50	2,209,778.20	31,286.61	3,617,912.31
24,627.00	.....	1,675,482.50	1,726,703.00	24,627.00	3,426,812.50
15,973.67	.....	1,091,857.50	1,132,750.00	15,973.67	2,240,581.17
23,833.90	.....	1,829,407.50	2,332,750.00	23,833.90	4,185,991.40
24,283.20	.....	8,108,797.50	3,834,750.00	24,283.20	11,967,830.70
23,987.52	.....	5,427,670.00	2,235,550.00	23,987.52	7,687,207.52
38,948.04	.....	3,756,447.50	1,873,200.00	38,948.04	5,668,595.50
41,208.00	.....	4,034,177.50	2,558,580.00	41,208.00	6,633,965.54
61,836.69	.....	20,202,325.00	2,374,450.00	61,836.69	22,638,611.69
64,157.99	.....	3,775,512.50	2,040,050.00	64,157.99	5,879,720.49
41,785.00	199.32	9,007,761.50	2,114,950.00	41,984.32	11,164,695.82
44,268.44	199.06	31,981,738.50	1,866,100.00	44,467.50	33,892,306.00
98,897.07	738.36	62,614,492.50	774,397.00	99,635.43	63,488,524.93
50,630.94	.....	56,846,187.50	999,410.00	50,630.94	57,896,228.44
66,411.31	648.47	39,377,909.00	9,077,571.00	67,059.78	48,522,539.78
42,361.56	276.79	25,915,962.50	8,619,270.00	42,638.35	34,577,870.85
15,748.29	282.50	29,387,968.00	3,501,245.00	16,030.79	32,905,243.79
26,904.63	202.15	36,857,768.50	5,142,240.00	27,106.78	42,027,115.28
177,834.56	175.90	32,214,040.00	5,478,760.00	178,010.46	37,870,810.46
246,000.00	.....	22,938,413.50	8,495,370.00	246,000.00	31,679,783.50
364,000.00	.....	14,780,570.00	3,284,450.00	364,000.00	18,429,020.00
205,660.00	.....	23,473,654.00	2,259,390.00	205,660.00	25,938,704.00
101,000.00	.....	83,395,530.00	3,783,740.00	101,000.00	87,280,270.00
280,750.00	.....	20,875,997.50	1,252,516.50	280,750.00	22,409,264.00
498,400.00	.....	22,445,482.00	809,267.80	498,400.00	23,753,149.80
529,737.14	.....	20,081,415.00	609,917.10	926,687.14	21,618,019.24
354,292.86	.....	28,295,107.50	691,005.00	968,552.86	29,954,665.36
98,265.00	.....	31,435,945.00	982,409.25	1,042,960.00	33,461,314.25
98,210.00	.....	23,828,625.00	908,876.25	1,819,910.00	26,557,411.25
102,665.00	.....	19,371,387.50	1,074,343.00	1,697,150.00	22,142,880.50
64,200.00	.....	17,582,987.50	1,266,143.00	963,000.00	19,812,130.50
4,680,577.44	39,926.11	729,047,572.50	136,478,368.40	10,891,393.55	876,417,334.45

XXX.—COINAGE OF THE MINTS OF THE UNITED STATES
RECAPITULATION—Continued.

Calendar years.	MINOR COINAGE.		
	Five cents.	Three cents.	Two cents.
Brought forward.....	\$4, 543, 200. 00	\$748, 620. 00	\$879, 070. 00
1870.....	240, 300. 00	40, 050. 00	17, 225. 00
1871.....	28, 050. 00	18, 120. 00	14, 425. 00
1872.....	301, 800. 00	25, 860. 00	1, 300. 00
1873.....	227, 500. 00	35, 190. 00	.....
1874.....	176, 900. 00	23, 700. 00	.....
1875.....	104, 850. 00	6, 840. 00	.....
1876.....	126, 500. 00	4, 860. 00	.....
1877.....	.....	.....	.....
1878.....	117. 50	70. 50	.....
1879.....	1, 455. 00	1, 236. 00	.....
1880.....	997. 75	748. 65	.....
1881.....	3, 618. 75	32, 417. 25	.....
1882.....	573, 830. 00	759. 00	.....
1883.....	1, 148, 471. 05	318. 27	.....
1884.....	563, 697. 10	169. 26	.....
1885.....	73, 824. 50	143. 70	.....
1886.....	166, 514. 50	128. 70	.....
1887.....	763, 182. 60	238. 83	.....
1888.....	536, 024. 15	1, 232. 49	.....
1889.....	794, 068. 05	646. 83	.....
1890.....	812, 963. 60	.....	.....
1891.....	841, 717. 50	.....	.....
1892.....	584, 982. 10	.....	.....
1893.....	668, 509. 75	.....	.....
1894.....	270, 656. 60	.....	.....
1895.....	498, 994. 20	.....	.....
1896.....	442, 146. 00	.....	.....
1897.....	1, 021, 436. 75	.....	.....
1898.....	626, 604. 35	.....	.....
1899.....	1, 301, 451. 55	.....	.....
Total.....	17, 444, 363. 35	941, 349. 48	912, 020. 00

FROM THEIR ORGANIZATION, BY CALENDAR YEARS—Continued.

RECAPITULATION—Continued.

MINOR COINAGE.		TOTAL COINAGE.			TOTAL VALUE.
Cents.	Half cents.	Gold.	Silver.	Minor.	
\$4,680,577.44	\$39,926.11	\$729,047,572.50	\$136,478,368.40	\$10,891,393.55	\$876,417,334.45
52,750.00		23,198,787.50	1,378,255.50	350,325.00	24,927,368.00
39,295.00		21,032,685.00	3,104,038.30	99,890.00	24,236,613.30
40,420.00		21,812,645.00	2,504,488.50	369,380.00	24,686,513.50
116,765.00		57,022,747.50	4,024,747.60	379,455.00	61,426,950.10
141,875.00		35,254,630.00	6,851,776.70	342,475.00	42,448,881.70
135,280.00		32,951,940.00	15,347,893.00	246,970.00	48,546,803.00
79,440.00		46,579,452.50	24,503,307.50	210,800.00	71,293,560.00
8,525.00		43,999,864.00	28,393,045.50	8,525.00	72,401,434.50
57,998.50		49,786,052.00	28,518,850.00	58,186.50	78,363,088.50
162,312.00		39,080,080.00	27,569,776.00	165,003.00	66,814,859.00
389,649.55		62,308,279.00	27,411,693.75	391,395.95	90,111,368.70
392,115.75		96,850,890.00	27,940,163.75	428,151.75	125,219,205.50
385,811.00		65,887,685.00	27,973,132.00	960,400.00	94,821,217.00
455,981.09		29,241,990.00	29,246,968.45	1,604,770.41	60,093,728.86
232,617.42		23,991,756.50	28,534,866.15	796,483.78	53,323,106.43
117,653.84		27,773,012.50	28,962,176.20	191,622.04	56,926,810.74
176,542.90		28,945,542.00	32,086,709.90	343,186.10	61,375,438.00
452,264.83		23,972,383.00	35,191,081.40	1,215,686.26	60,379,150.66
374,944.14		31,380,808.00	33,025,606.45	912,200.78	65,318,615.23
488,693.61		21,413,931.00	35,496,683.15	1,283,408.49	58,194,022.64
571,828.54		20,467,182.50	39,202,908.20	1,384,792.14	61,054,882.84
470,723.50		29,222,005.00	27,518,856.60	1,312,441.00	58,053,302.60
376,498.32		34,787,222.50	12,641,078.00	961,480.42	48,389,780.92
466,421.95		56,997,020.00	8,802,797.30	1,134,931.70	66,934,749.00
167,521.32		79,546,160.00	9,200,350.85	438,177.92	89,184,688.77
383,436.36		59,616,357.50	5,698,010.25	882,430.56	66,196,798.31
390,572.93		47,053,060.00	23,089,899.05	832,718.93	70,975,677.98
504,663.30		76,028,485.00	18,487,297.30	1,526,100.05	96,041,882.35
498,230.79		77,985,757.50	23,034,033.45	1,124,835.14	102,144,626.09
536,000.31		111,344,220.00	26,061,519.90	1,837,451.86	139,243,191.76
13,347,409.39	39,926.11	2,104,580,203.00	778,280,379.10	32,685,068.33	2,915,545,650.43

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